THE Journal of the Kansas Medical Society

MARCH
1955

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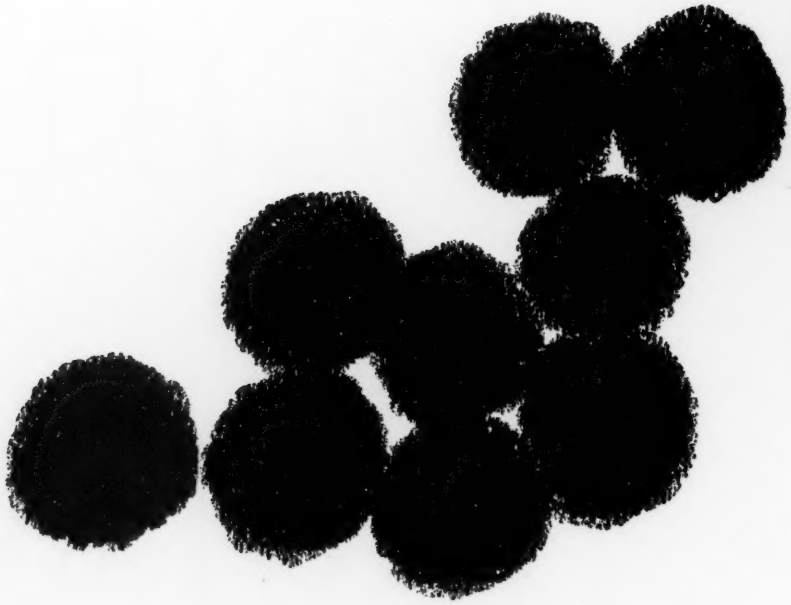

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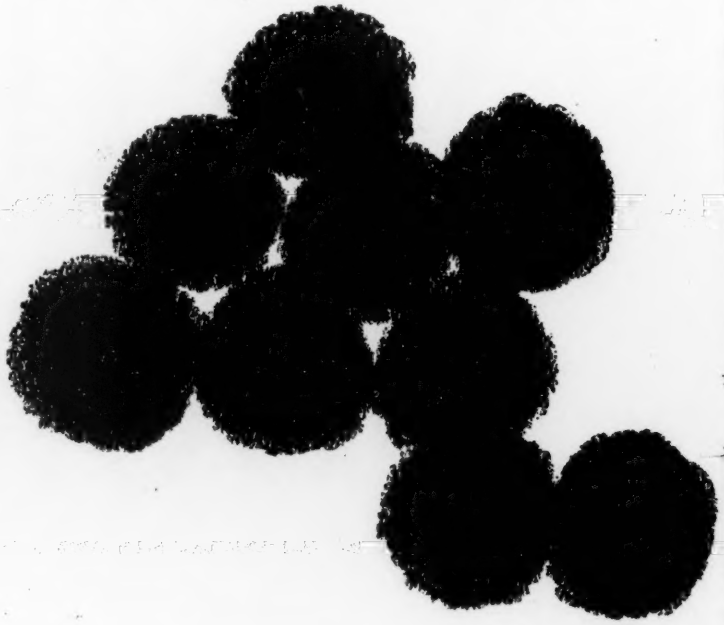

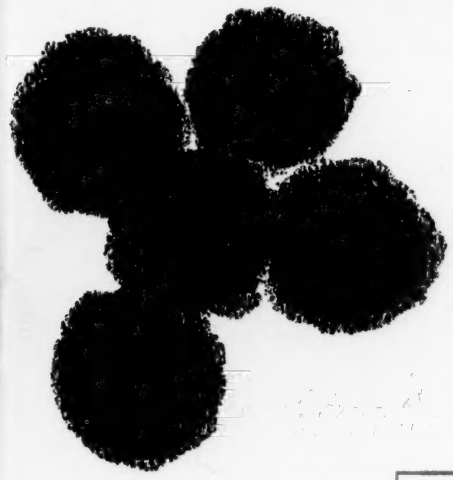

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*Pratt, R., & Dufrenoy, J.: Texas Rep. Biol. & Med. *12*:145, 1954.

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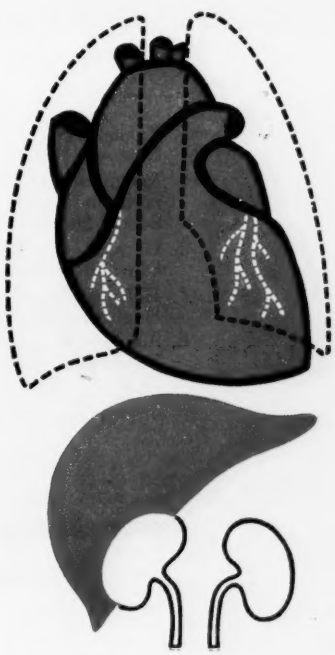

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1. Taggart, H. A.: Protein Metabolism in Relation to Nutritional Aspects of Medical Diseases, Pennsylvania M.J. *54*:339 (1951).
2. Marquardt, G. H.; Cummins, G. M., and Fisher, C. I.: Blood Protein Replenishment in Treatment of Nephritic Edema, Quart. Bull. Northwestern Univ. M. School *26*:140 (1952).
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5. Stieglitz, E. J.: Nutrition Problems of Geriatric Medicine, Report of Council on Foods and Nutrition, J.A.M.A. *142*:1070 (Apr. 8) 1950.

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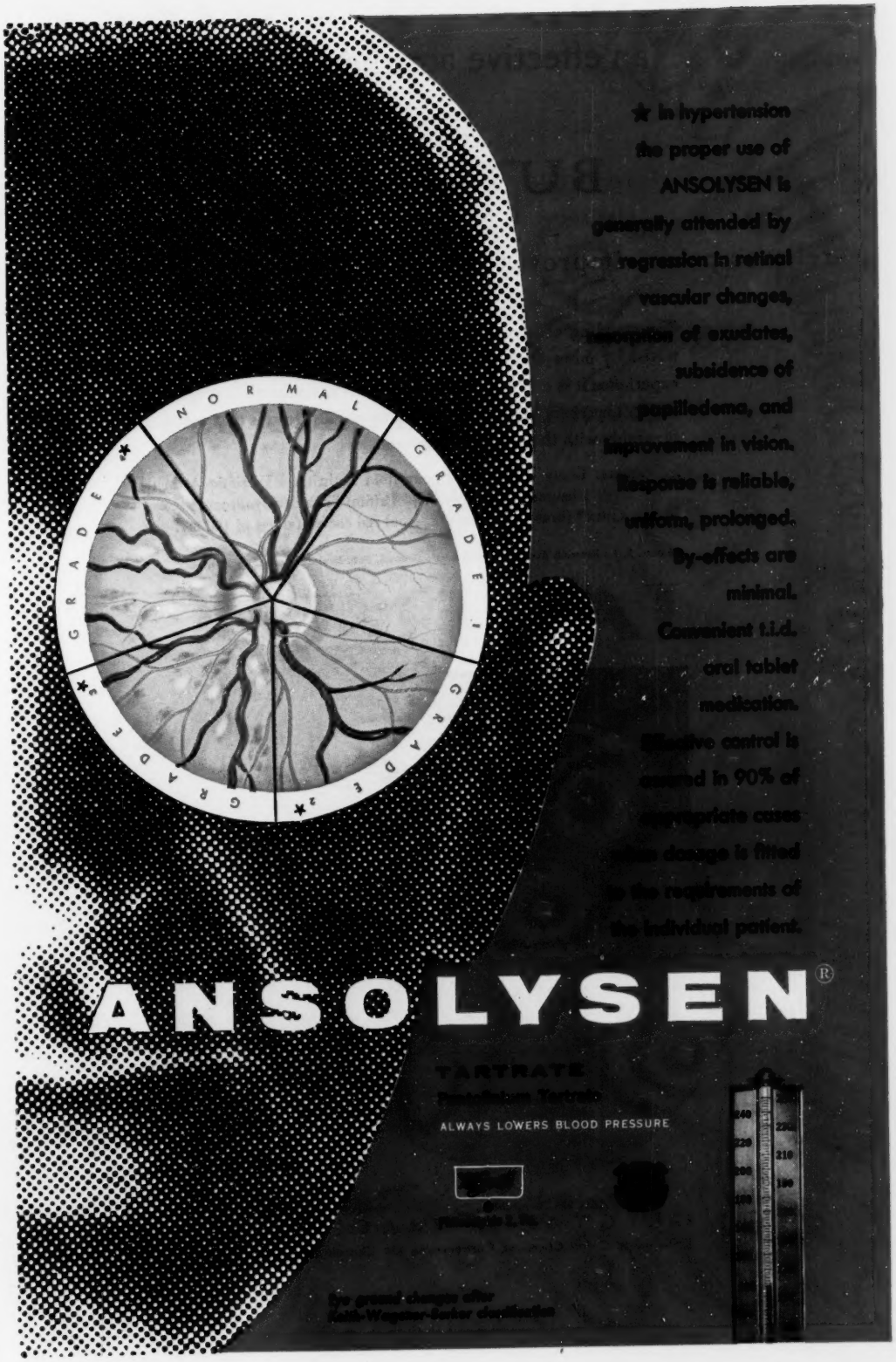
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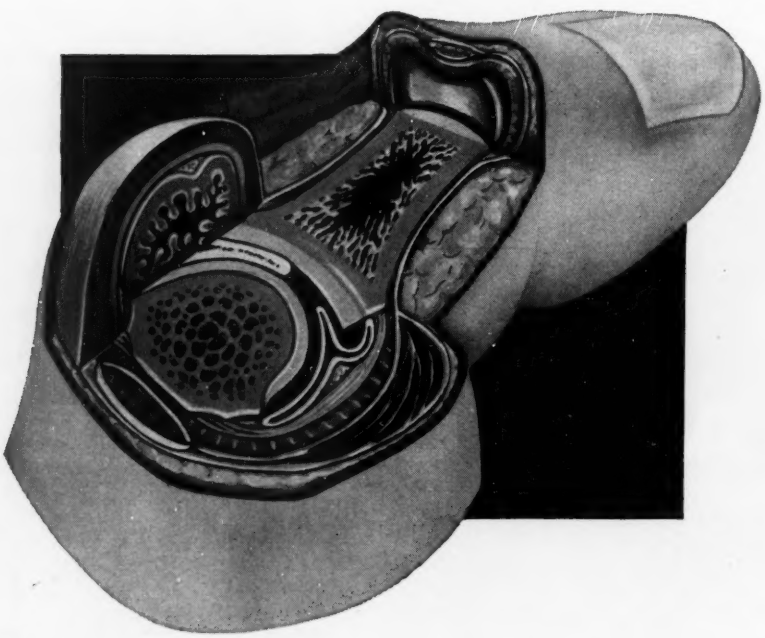

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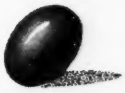

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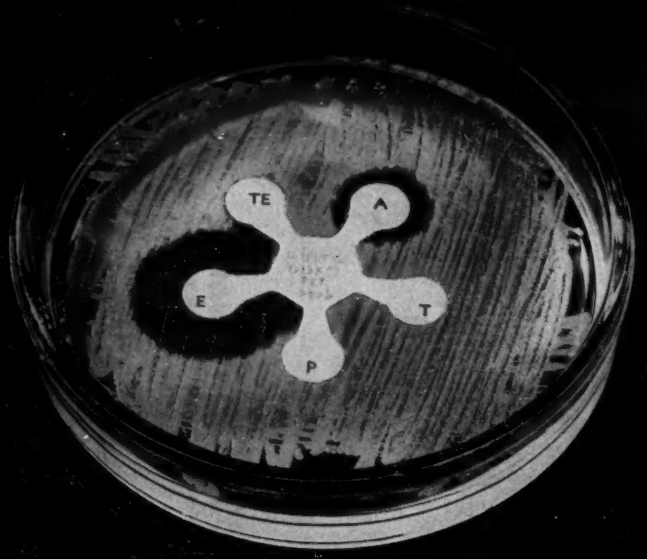

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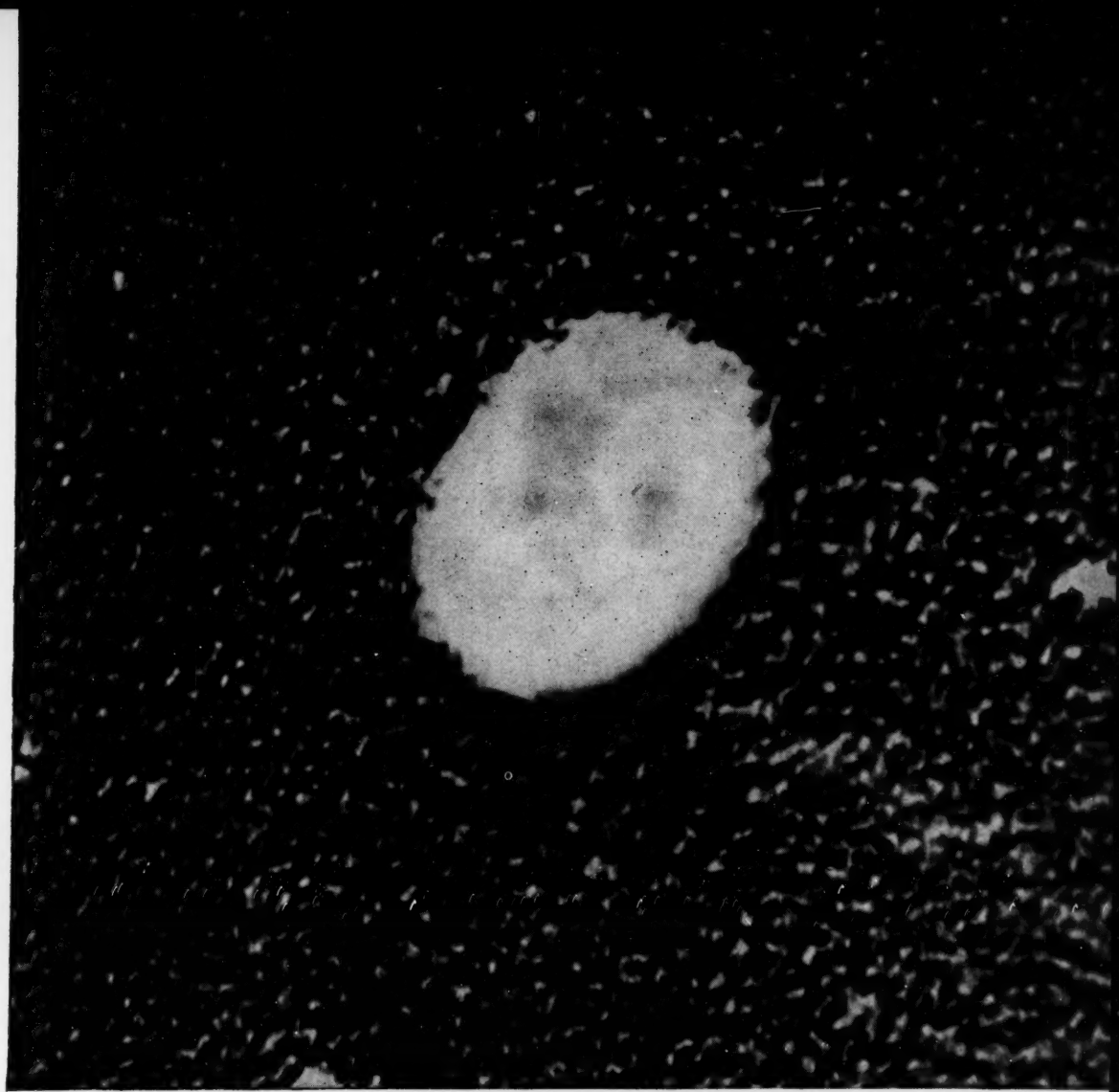

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Volume LVI MARCH, 1955 No. 3

Hepatic Coma, a Review of Twenty-Seven Cases

Charles Andrews, M.D., Mahlon Delp, M.D., and
Mary Jane Elliott, R.N.
Kansas City, Kansas

Hepatic coma is a syndrome frequently associated with severe hepatic insufficiency and characterized by central nervous system dysfunction that progresses to coma. Classically the clinical picture includes delirium, flapping tremor, distinctive moaning cry, and signs and symptoms of liver failure depending upon the type of underlying hepatic disorder. Recently considerable progress has been made in elucidating the factors involved in the pathogenesis of this syndrome. In order to evaluate our experience in light of this new knowledge, we have reviewed 27 cases of hepatic coma observed in the University of Kansas Medical Center.

METHODS

All the charts carrying the diagnosis of hepatic or biliary tract disease between the dates January, 1947, to March, 1954, were reviewed. The following criteria were used to make the diagnosis of hepatic coma: (1) the presence of coma associated with delirium, flapping tremor, fetor hepaticus, or other signs and symptoms usually associated with hepatic coma; (2) the presence of primary or secondary liver disease; and (3) the absence of any other disease that would adequately explain the coma.

Undoubtedly, some cases of hepatic coma were not included. It is difficult to determine the cause of coma in patients after massive hematemesis has occurred or with malignant tumors which have spread to the liver and other organs. If there was reasonable doubt as to the diagnosis, the case was not included. Twenty-seven cases were found suitable for review.

RESULTS

The diagnosis of the underlying liver disease in each case is listed in Table I. Post-mortem examination was done in 21 cases and liver biopsy in two others. In the remaining four patients the diagnosis was made on the following evidence.

TABLE I
DIAGNOSIS AS TO UNDERLYING LIVER DISEASE

Diagnosis	*Males*	*Females*	*Total*
Diffuse hepatic fibrosis	6	7	13
Post necrotic cirrhosis	1	2	3
Infectious hepatitis with massive hepatic necrosis	0	3	3
Diffuse hepatic fibrosis following infectious hepatitis	3	0	3
Biliary cirrhosis	1	2	3
Homologous serum hepatitis	0	1	1
Replacement of liver by tumor	1	0	1

Patient PD had a six-week history of malaise and fever. Jaundice, ankle edema, ascites, and hepatomegaly developed rapidly. After receiving ammonium chloride as a diuretic, she became comatose, and six days later she expired. A diagnosis of infectious hepatitis with massive hepatic necrosis and hepatic coma was made.

Patient CW had a ten-year history of alcoholism, and a diagnosis of cirrhosis had been made one year previously. Three days prior to admission she became irrational and was admitted in coma. Jaundice, ascites,

Dr. Andrews is a resident in medicine at the University of Kansas Medical Center, Dr. Delp is professor of medicine at the University of Kansas Medical Center, and Miss Elliott is administrative medical supervisor at the University of Kansas Medical Center.

dilated abdominal veins, hepatomegaly, and abnormal liver function tests were present. She expired seven days later still in coma.

Patient EY was an alcoholic in whom a diagnosis of cirrhosis had been made two years previously. Vomiting and confusion had preceded her admission to the hospital in coma.

Patient ZM had a history of receiving three blood transfusions four months prior to admission. She developed anorexia and jaundice one week before coming to the hospital. She rapidly became incoherent and comatose. On admission she had a large tender liver and was deeply jaundiced. She expired one day later. A diagnosis of hemologous serum jaundice with massive hepatic necrosis and hepatic coma was made.

Diffuse hepatic fibrosis (cirrhosis) was present in half the patients. This finding was not unexpected since this disorder is probably the most frequent type of chronic liver disease.

In the one 15-year-old male with Hodgkin's disease, extensive replacement of liver tissue ended in a terminal picture of hepatic coma.

Data as to sex, race, and age were summarized as follows: Neither sex predominated greatly in this series, there being 15 females and 12 males. Twenty-two patients were Caucasian and five were Negro. This roughly represents the ratio of admission of the two races to this hospital. The youngest patient was eight and the oldest 67. Four patients were in the third decade, eight in the fourth, seven in the fifth, and four in the sixth. The remaining four patients were in the first or second decade.

TABLE II

PRE-COMA SYMPTOMS AND SIGNS

Symptom or Sign	*Number of patients in whom present*
Delirium	20
Moaning or peculiar cry	14
Flapping tremor	11
Lethargy and weakness	8
Fetor hepaticus	8
Restlessness and apprehension	5

Table II lists the variable symptoms and signs most frequently observed just prior to the onset of coma. Twenty of the 27 patients were irrational and confused, while 14 had the peculiar moaning cry often associated with hepatic coma.

Table III lists the most frequent physical findings. All were jaundiced at the onset of coma. Table IV summarizes the neurological signs present during coma. The temperature of these patients varied considerably. Three patients had no fever, while 24 had a temperature above 99 degrees. Six of the latter had a temperature above 104 degrees.

Tables V and VI list laboratory data. Nonprotein nitrogen values above 35 mg. per cent were noted in 15. In no instance was there other clinical or pathological evidence suggestive of primary renal disease. In nine patients the CO_2 combining power was below 20 milli-equivalents per liter. Six of these patients also had serum sodium values below 130 milli-equivalents per liter. As coma progressed the serum sodium tended to drop even more. In 12 instances the serum potassium was below five milli-equivalents per liter. With one exception those patients with electrolyte disturbances had ascites. In 19 patients there were no electrolyte abnormalities. Liver function studies showed no consistent pattern. In general the tests showing hepatocellular dysfunction were markedly abnormal.

TABLE III

PHYSICAL SIGNS

Physical Sign	*Present*	*Absent*	*Not Noted*
Jaundice	27	0	0
Hepatomegaly	25	2	0
Ascites	18	9	0
Evidence of collateral circulation	18	7	2
Splenomegaly	11	16	0
Spider nevi	9	8	10
Liver palms	9	3	15

Of considerable interest were those patients in whom a precipitating factor for the coma could be determined. Table VII summarizes these factors.

Obviously, all patients in this group represent treatment failures. The usual therapy included a diet high in protein, high in carbohydrate, and with moderate fat. Other items such as liver extract, intravenous glucose and electrolytes, parenteral vitamins, and antibiotics as indicated were given. Steroid therapy in the form of ACTH, cortisone, or adrenal cortical extract was used in 15 patients. Several of the latter were moribund at the time these drugs were given. Two of the three patients who survived more than one episode of coma (Table VIII) received steroids, and it was felt that these drugs contributed to their recovery. Both, however, later succumbed to complications of their disease.

DISCUSSION

Our data as to symptoms, signs, and laboratory findings are essentially the same as those in other reports.[1, 5] The development of confusion, lethargy,

TABLE IV

NEUROLOGICAL SIGNS DURING COMA

Neurological Sign	*Number of patients in whom present*
Normal reflexes	14
Babinski	6
Hypoactive reflexes	5
Absent reflexes	2
Hyperactive reflexes	2
Nystagmus	1
Convulsions	1

TABLE V

HEMOGLOBIN, WBC. AND LIVER FUNCTION STUDIES*

Case	Hgb. Gms.	WBC	SB D	SB T	AP	UU	FU	PT	Brom.	CC	TT	CE	SA	SG	SI	TC
HF	14.0	6,150	0.7	4.0	2.5	19.8	820	28%		4	18	40%	2.5	3.0	220	175
EA	8.4	6,900	0.8	1.5	5.0	0.7		78%		4	22	50%	4.5	3.5		146
HJ	12.0	3,850	12.0	24	3.0	1	200	48%		4	28	30%	2.5	4	140	200
FR	9.8	5,050		12	33.6		4	29%		4		36%	2.0	4.0		250
HB	14.2	4,350	4.0	7	12.2			55%		1	4	6%	3.0	2.0	45	175
MB	10.7	26,650	5.0	10	10		133	33%		2	10	20%	2.0	3.0		250
TL	11.8	16,600	2.0	5	2.0	0.9		20%		4	20	40%	3.3	3.0	135	200
MMc	13.8	13,600	14.2	36	8.0	4		10%		4	20	30%	3.0	3.0	225	150
CG	8.0	6,250	11.8	19.4	8.0			30%		2	0	10%	2.5	0.3	381	43
EA	12.0	29,650	3.0	16	5			15%		3	9	10%	3.5	3.0	170	100
EY	11.3	2,950		12		0	100	10%	85%	4	53	40%	1.0	6.5		100
AC	10.9	10,650	12	16	10	2		14%		3	16	10%	3.5	2.0	56	200
EW	3.4	14,200	8.6	16	2.0					4	10	10%	2.5	3.0		100
PD	11.8	11,550	8.6	14	2.5	3.0		20%		4	20	20%	2.5	3.5	156	100
KS	9.5	4,700		17.5	24	0.3		38%	5%	1	14	40%	1.0	3.5		200
PK	13	6,900	6.8	14		6.0	75	80%	100%	2	24	30%	1.37	3.23		200
IT	12.6	10,200	2	3.5	2.0			10%		4	49	30%	2.0	4.5	70	150
FY	11.4	6,600	15	24	3			12%	20%	4	60	20%	2.5	4.5		175
LTi	11.4	5,600	4	4	10			30%	20%	4	12	50%	3.5	3.5		150
JN	11.7	4,750	1.5			4.0	150	30%	65%	4	18	40%	2.0	3.0		98
CB	8.0	10,450	3.0			17.8	40	40%		3	8	50%	2.0	2.5		250
CW	6.0	21,500	1.0	8.2						1	5	50%	1.8	2.6		212
WS	12.3	8,600		2.0				48%	10%	3	7		3.5	2.0		168
WR	9.0	9,200		14						3	5	20%	1.5	3.0		
ZM	13.0	26,000														
NS								18%					2.3	3.2		

* Key to abbreviations of tests:

SB-D	Direct serum bilirubin in mgm./100 cc.
SB-T	Total bilirubin in mgm./100 cc.
AP	Alkaline phosphatase in Millimol units
UU	Urine urobilinogen in units in a two hour urine sample
FU	Feces urobilinogen in mgm. per 24 hours
PT	Prothrombin in per cent of normal
Brom.	Bromsulphthalein, 5 mgm. per kilo, in per cent retained
CC	Cephalin cholesterol, 0 to 4+
TT	Thymol turbidity in units
CE	Cholesterol esters in per cent
SA	Serum albumin in gm./100 cc.
SG	Serum globulin in gm./100 cc.
SI	Serum iron in gamma per cent
TC	Total serum cholesterol in mgm./100 cc.

flapping tremor, or fetor hepaticus formed the most helpful symptoms and signs in predicting that coma was imminent. Biochemical liver function studies were not helpful in predicting the onset of coma or its outcome.

The importance of ammonia in the pathogenesis of hepatic coma has recently been emphasized. Actually, this relationship was suspected by Matthews in 1922, when he noted coma in Eck fistula dogs after they had been fed high protein diets.[6] Elevated blood ammonia values in both cirrhosis and hepatic coma have been noted by several investigators;[7, 10] how-

TABLE VI

ELECTROLYTES AND NPN STUDIES CORRELATED WITH ASCITES

Case	NPN	CO_2	Na	K	Cl	Ascites
MB	117	12.6	111	5.4	82	Yes
FY	30	26.6	131	4.6	102	No
MMc	42	21.8	144	5.1	102	No
EA	102	11.9	127	5.0	103	Yes
AC	Too high to read	38.2	130	2.6	87	No
PK	34					Yes
LTi	65	25	127	4.6	113	Yes
KS	37	16.8	138	5.0	97	Yes
JN	37	28.8	455	mgm % as NaCl		Yes
IT	101	18.5	128	4.5	105	No
WR	33					No
NS	46.6	17.9				Yes
EW	70	13.5	132	4.1	89	Yes
CB	34	29.4				No
LT	215					No
EY	50	10.6	500	mgm % as NaCl		Yes
CW	30		490	mgm % as NaCl		Yes
WS	30	18.9	128.9	5.3		Yes
ZM	105	28.9	360	mgm % as NaCl		No
FR	60	18.5				Yes
TL	44	30.6	127	3.1	94	Yes
PD	28	24.7	125	4.5	107	Yes
EA	159	25.0	138	5.0	108	Yes
HF	56	20.3	132	4.5	105	Yes
CG	32.5	23.0	130	4.5	101	Yes
HJ	32	22.2	123	5.2	111	Yes
HB	33	23.2	139	4.9	102	No

TABLE VII

FACTORS PRECIPITATING COMA

Patient	Precipitating factor	Amount of drug taken	Time Interval between factor and coma
WS	Ammonium Chloride	11 Gms. over 4 days	3 days
CB	Ammonium Chloride	10 Gms. over 4 days	2nd day of drug
PD	Ammonium Chloride	20 Gms. over 8 days	On 9th day
EA	Amigen	1000 over 4 days	Coma on 4th day
	Aminosol	4000	
TL	Resodec	30 Gms. for 2 days	Coma 2nd day
		45 Gms. over 4 days	Coma 4th day
HF	Diamox	250 mgm. one dose	Coma next day
MB	Seconal	90 mgm. for 2 days	Coma 6 hours
	Paracentesis		after 2nd dose
FY	Demerol	50 mgm.	Irritable before drug. Coma 1 hour later
NS	Nembutal	90 mgm.	5 hours after drug
EY	Paracentesis		Irrational when done. Coma 2 hours later

TABLE VIII

PATIENTS WHO SURVIVED MORE THAN ONE EPISODE OF COMA

Patient	Time in Coma 1st episode	2nd episode	3rd episode	Final outcome
LT	4 days	5 days	.. ..	Death 2nd episode
JN	4 days	8 days	2 days	Death 3rd episode
TL	2 days	2 days	.. ..	Death weeks later from pulmonary emboli

ever, the amount of ammonia in the blood does not correlate well with the severity of the neurological symptoms.

The liver is the most important single organ concerned with protein metabolism, as illustrated by its recognized responsibility for formation and deamination of most amino acids. Ammonia from the latter reaction is converted to urea by the liver. It is postulated that in severe liver disease there is a breakdown in this mechanism with accumulation of ammonia in the blood. The toxic ammonia then produces hepatic coma through its effect on the central nervous system.

Walshe theorized that an abnormality of glutamic acid metabolism is responsible for the neurological changes recognized as hepatic coma.[7]

Glutamic acid is unique as the only amino acid supporting cellular respiration in the brain. It is also the one substance having the ability to detoxify and prevent accumulation of ammonia within the brain. Glutamine, the end product of this reaction, was found by Walshe to be present in abnormally high concentrations in the spinal fluid of patients in hepatic coma. A further finding of interest is that sulphoxide will inhibit glutamic acid metabolism in bacteria. Walshe also found elevated levels of this compound in two of his patients with hepatic coma. Thus, even though the exact mechanism is not clear, it seems certain that an increased amount of blood ammonia is in some way related to the pathogenesis of hepatic coma.

Several clinical studies support the above thesis. Gabuzda[11] and Phillips[12] reported the syndrome of impending hepatic coma in patients with cirrhosis who were given exchange resins. Since these resins exchange ammonia for sodium, it was felt they led to an elevated blood ammonia. McDermott and Adams[13] reported a patient in whom an Eck fistula had been produced during surgery for carcinoma of the pancreas. Typical symptoms of impending hepatic coma could be produced by feeding the patient a high protein diet, urea, ammonium chloride, or exchange resins. Electroencephalographic changes similar to those previously noted in patients with hepatic coma were also recorded in this patient during the episodes of precoma. Traeger[9] fed four patients with cirrhosis ammonium chloride and noted that the blood ammonia was elevated to a higher level and for a longer time than in four normals given the same dose of the drug.

Our experience with ammonia-containing compounds as a precipitating factor in hepatic coma is summarized in Table VII. It was felt that ammonium chloride administration led to hepatic coma in three instances (WS, CB, and PD). One patient, (EA) who had had a portal caval anastomosis, received amino acid preparations intravenously following surgery. His postoperative course had been relatively uneventful until that time. On the fourth day of Aminosol he developed typical hepatic coma and expired shortly thereafter. One patient (TL) had two episodes of coma precipitated by an exchange resin. He recovered from both episodes only to expire later of pulmonary emboli. Of special interest is patient HF who had typical diffuse hepatic fibrosis with ascites. His course was uneventful until he received Diamox as a diuretic. Within 24 hours he had developed hepatic coma from which he did not recover.

We have observed two other patients with cirrhosis who became confused and lethargic but did not develop true coma after receiving this drug. Diamox blocks carbonic anhydrase in the kidney, and hydrogen ions necessary for the conversion of ammonia to the ionic form are not produced. Without this conversion the ammonia produced by the kidney to conserve base is not excreted in the urine but is absorbed into the blood. In patients with severe liver damage, toxic levels are soon reached.

Gastrointestinal bleeding has been recognized as often precipitating hepatic coma.[1, 3] Sixteen of our patients had hematemesis or tarry stools at some time during their course. Fifteen of these had hemoglobin values below 12 grams. Because the liver is so dependent upon the portal flow for its oxygen supply, bleeding episodes resulting in disproportionate reduction in portal over systemic flow may easily insult seriously and impair the already damaged liver parenchyma. Coma may intervene under such circumstances.

Paracentesis for relief from ascites in liver disease has so frequently been followed shortly by hepatic coma that it has also been reported as a contributing factor in the pathogenesis. Evaluation of this matter requires inquiry into the cause of ascites in patients with chronic liver disease. At least three factors are pertinent: (1) increased portal pressure, (2) lowered plasma osmotic pressure secondary to decreased albumin concentration, and (3) a tendency to retention of sodium and water due perhaps to a derangement of hormones that control water and electrolyte balance.

Prentice,[15] by means of tritium studies, showed that 40 to 80 per cent of the ascitic fluid passes back and forth into the circulation every hour. Since ascitic fluid contains a slightly higher concentration of sodium chloride and a slightly lower concentration of potassium and albumin as compared with serum, the removal of several liters may produce a profound disturbance of water and electrolyte balance.[14] Serious changes in blood and plasma volumes may further impair the function of already damaged liver cells. Coma may be produced or worsened. In one of our patients (MB), paracentesis probably precipitated

coma, and in one (EY) made already existing coma much worse.

Patients with severe liver disease are unable to detoxify opiates and barbiturates. In three of our patients (MB, FY, NS), such agents seem implicated in the coma.

Treatment of the patient in hepatic coma is discouraging. The usual therapy of chronic liver disease, diet, vitamins, liver extract, and intravenous glucose is necessary. Protein in the diet should probably not exceed two grams per kilogram per day. The value of steroids in therapy of hepatic coma has not been determined. We feel that these drugs are indicated since they seemed to be of some benefit in a few of our patients to whom they were given during the period of confusion before the onset of deep coma. Of greatest importance is the avoidance of compounds containing ammonia or those that will increase the body ammonia such as acetazolamide, cation exchange resins, and amino acid preparations. Paracentesis should be done with extreme caution and with the removal of not more than one or two liters of fluid. Careful attention should be directed to the serum electrolytes. Occasionally it is necessary to administer hypertonic salt solution to correct a hyponatremia. Supplemental potassium is practically always necessary. The hemoglobin should be kept as near normal as possible by means of blood transfusions. Antacids and slight elevation of the patient's head are sometimes helpful in preventing bleeding from esophageal varices. Recently Walshe and others[16, 17] have reported successful use of intravenous sodium glutaminate in hepatic coma. If our present concepts as to the pathogenesis of this syndrome are correct, this should be useful in the management of these patients.

SUMMARY

1. Twenty-seven cases of hepatic coma have been reviewed. The symptoms, signs, and laboratory findings did not differ from those previously reported in the literature.

2. In 10 instances a factor precipitating hepatic coma was strongly indicated. Ammonia-containing compounds were suspected in six, barbiturates or opiates in two, and paracentesis in one. Sixteen patients had evidence of gastrointestinal bleeding which was undoubtedly a factor in producing further hepatic insufficiency and coma.

3. Present concepts as to the role of ammonia in the pathogenesis of hepatic coma have been briefly reviewed.

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Organized medicine is the mortar that cements 160,000 individual physicians into a solid fortress. This intact structure has a dual purpose—to protect the health of 160,000,000 inhabitants and to present a solid bulwark against external forces. Individual, loose bricks can be tossed around by a child; bricks well cemented together can resist cannon fire.

Sidney C. Pratt, M.D., President
Montana Medical Association

Experience with a New Urographic Agent—Hypaque

G. M. Tice, M.D.
Kansas City, Kansas

Progress in the improvement of radiopaque contrast media suitable for use in excretion urography has been steady since the first compound was tested by Swick in 1929.[1] This was an iodine-containing organic compound known as Uroselectan. Swick later introduced Hippuran, a compound which represents a normal product of animal metabolism acting as a carrier for the radiopaque chemical. This was followed by Uroselectan B and later by Abrodil or Skiodan. These were followed by Diodrast, which became one of the standards in the field of excretion urography.

As the compounds and techniques for using them improved, greater emphasis was placed on reduced toxicity and increased radiopaque content. The increased pressure of patient volume made it desirable to reduce the time involved in the actual injection of the media and the time lapse before adequate visualization could be obtained. The toxicity of the media still remains the primary consideration.

An effort to increase the iodine concentration per molecule was made with the introduction of sodium acetrizoate, which was the first commercially available triod compound. The increase in iodine from 2 to 3 atoms per molecule makes it possible to give 5.1 gms. of iodine in a 25 cc. dose of 30 per cent sodium acetrizoate (Urokon Sodium—Mallinkrodt) as contrasted to 3.5 gms. of iodine per 20 cc. of 35 per cent solution of iodopyracet (Diodrast—Winthrop-Stearns, Inc.) or 5.2 gms. of iodine in a 20 cc. dose of 50 per cent sodium iodomethamate (Neo Iopax—Schering).

Sodium acetrizoate is available in 30 and 70 per cent concentrations. Both of these concentrations have been tested for intravenous pyelography at this institution. Although there has been a decrease in injection time and a decrease in the time lapse before a diagnostic film is reached, the possibility for improvement in toxicity and side effect ratios remains. There is also some question as to the advisability of using the 70 per cent concentration as a routine pyelographic agent.

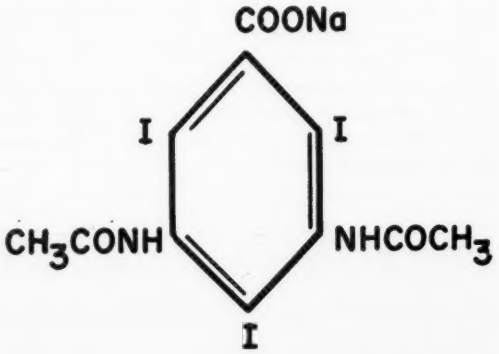
CRITERIA

Hospital or large clinic routine requires that the media used for intravenous pyelography be:

1. As non-toxic as possible (both from the standpoint of generalized reaction and from the standpoint of local tissue irritation or vein cramp).
2. Available in containers which are easily handled. (A testing solution should be available in a separate ampule.)
3. Tolerated when injected rapidly as required by the newer techniques for production of nephrograms.
4. Visible in the kidney in sufficient density for diagnosis as rapidly as possible in order to conserve time on the x-ray table.
5. Productive of films of good quality so that the number of retakes is as low as possible.
6. Suitable for all commonly used techniques requiring radiopaque media, if possible.

With these criteria in mind, we propose to report recent work which has been done in testing Win 8308-3 (Hypaque—Winthrop-Stearns, Inc.).

Hypaque Sodium is 3,5-diacetamido-2,4,6-triiodobenzoate ($C_{11}H_8I_3N_2NaO_4$). It has a molecular weight of 636.0 with the following structural formula:



Hypaque Sodium is a white crystalline solid which contains 59.87 per cent iodine and is highly water soluble. The pH of the solution is 7.0 to 7.5. If a solution of Hypaque Sodium is chilled below room temperature, it may become cloudy or form a precipitate which disappears upon warming to room temperature. The sterile aqueous solution is clear and nearly colorless. It has a faint bitter taste, and it can be sterilized by heat in the customary manner without decomposition. It should be protected from strong light.

The laboratory data as supplied by Winthrop-

Dr. Tice is professor of radiology, University of Kansas School of Medicine.

Stearns, Inc.,[2] lists the results of animal testing with this media. The LD 50 for the following test animals is given.

Mice	12,600 mg/kg. ± 877
Rats	10,750 mg/kg. ± 500
Cats	11,300 mg/kg.

Rabbits were injected intravenously with 2,300 mgm/kg. without evidence of toxicity. The first vomiting occurred in the monkey at a dose of 4,000 mgm/kg. Deaths in this series appeared to be due to respiratory failure. In subacute toxicity testing, no significant hematologic changes were encountered, growth rates were not affected, bodyweight gains remained normal, and no microscopic lesions attributed to the media were noted during the experiments on rats, cats, mice, and monkeys. In chronic irritation studies in rabbits, it is apparent that Hypaque 50 per cent produced no greater irritation than sodium acetrizoate 30 per cent or Diodrast 35 per cent. It definitely appears to be less toxic than Diodrast 70 per cent or sodium acetrizoate 70 per cent.

DESCRIPTION OF TESTING

Two hundred eighteen patients, ranging in age from 7 to 85 years, were given Hypaque. Each patient was routinely prepared by dehydration and enemas prior to injection. No effort was made to select patients. Our technique remained unchanged except for an effort to establish injection times and optimal times for taking of the film. Compression was used where the patient's condition permitted.

The first 40 cases tested received a complete preinjection work-up, including allergic history and pertinent laboratory work. Every patient received a skin wheal of the dye and a slow intravenous injection of one cc. of material. After one minute the injection of 30 cc. of Hypaque was made over a period of four minutes. Blood pressure, pulse, and temperature were taken before, during, and after the injection. Any side effects which could be related to the dye were noted.

As a result of almost complete freedom from side effects on the first 40 cases, it was decided to increase injection speed. This was gradually done until the complete 30 cc. injection was being made in one minute (approximately as fast as the dye could be injected through a No. 20 needle). All patients were carefully observed for any reaction which might be attributed to the dye. Films were taken at 2, 4, 15 and 20 minutes.

SIDE EFFECTS

Of the 218 cases tested, 16 showed nausea, which in most instances was slight. Five patients actually vomited, and two patients showed slight urticaria. In one case in which a resident started an injection, the patient vomited after two or three cc. The resident properly discontinued the injection and returned the patient to the floor. Twenty-four hours later the patient was reinjected in a routine manner and did

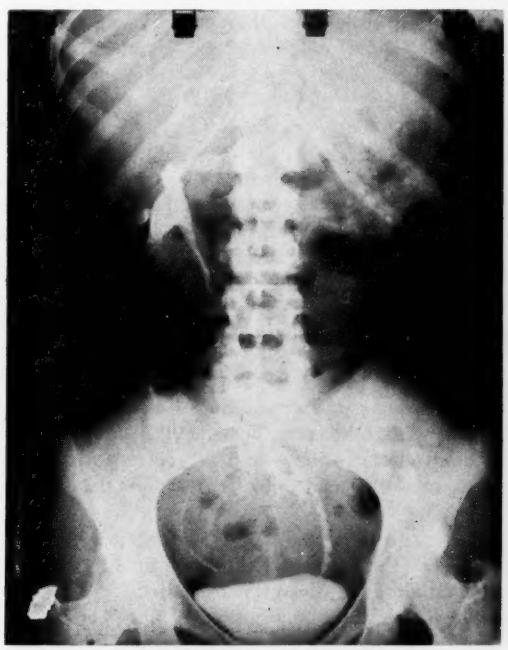


Figure 1. Ectopic kidney on the left, 20 minutes after intravenous injection of 30 cc. of 50 per cent Hypaque.

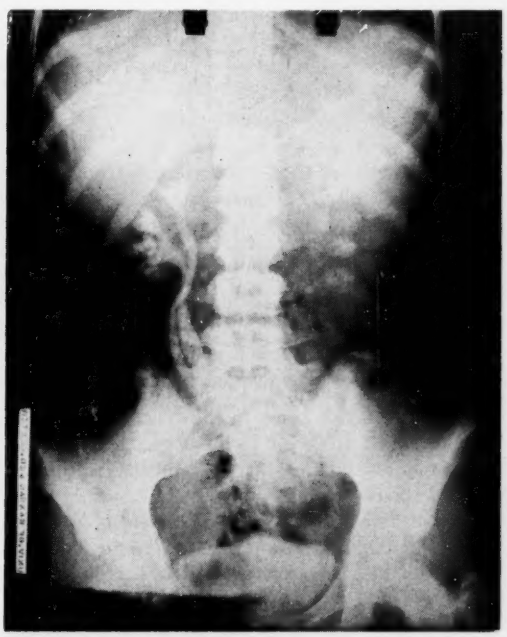


Figure 2. Twenty minutes after intravenous injection of 30 cc. of 50 per cent Hypaque.

not suffer the slightest reaction. This may serve to classify some of the patients showing nausea as a psychic reaction. A few of the patients gave an allergic history, but none of these individuals had any reaction.

Nausea	16 patients	7.5 per cent
Vomiting	5 patients	2.4 per cent
Urticaria	2 patients	0.1 per cent
Vein Spasm	0 patients	0.0 per cent
TOTAL Side Effects		10.0 per cent

Expressed differently and perhaps more significantly, 91.8 per cent of the patients were completely free from any side effects. We encountered no significant blood pressure drops, no respiratory distress, and no vein cramp.

EVALUATION

Evaluation of films was left almost entirely to the author. It is most difficult to arrive at an accurate evaluation of the concentration of media in a given case because of the variation in technique and the variation in the size of the patient. We attempted to discount these extraneous features and tried to impartially evaluate the concentration of the media.

Our evaluation was as follows:

Excellent	59
Good	97
Fair	43
Poor	14
No excretion of dye	4
Examination discontinued because of reaction at the site of the test dose	1
TOTAL	218

In our experience most films demonstrated clearly the renal pelvis, ureters, and bladder. Our best films were taken at four minutes.

SUMMARY AND IMPRESSIONS

Two hundred eighteen patients were injected with a new intravenous pyelographic agent, Hypaque. Our criteria for the qualifications of a good media are listed. The side effects encountered with Hypaque are described, and the results of the rating of films of these 218 examinations are given. We were impressed at the relative freedom from side effects. It is our impression that the density, dependability, speed of concentration, and general lack of discomfort to the patient when Hypaque is used cause this media to compare favorably with any available today.

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The Adolescent Conscience

Harry G. Gianakon, M.D.

Kansas City, Kansas

There are increasingly alarming reports about the conduct and behavior of our adolescents. We are being deluged with a mass of statistics which reveals that great numbers of adolescents are involved in serious crimes, in delinquency and vandalism, and in general recklessness and irresponsibility. It is possible to point to the historical fact that each adult generation has frequently come to the conclusion that the "young people are going to the dogs." It is possible, therefore, to consider that our more scientifically-minded society is simply using more advanced methods of making just that type of age-old observation.

An objective study, however, leads to the inevitable conclusion that this solution is too simple and too pat to be applied to the current situation. Obviously, something of major concern is developing, and the difficulties which our modern adolescent is facing are of such a proportion that they constitute a major threat to our entire concept of the "normal" pattern of human development. As we read accounts of adolescent gangs demolishing libraries, assaulting older persons, defying our established moral and ethical codes, we cannot help but conclude that something has happened to what we may term the "adolescent conscience."

An exploratory study of this subject was made at the Child Study Unit, University of Kansas. The method consisted of asking a number of adolescents who were having difficulties in the "conscience" area, to produce their thoughts and versions of the topic. With characteristic adolescent enthusiasm, they

Presented at the Pediatrics Postgraduate Course, University of Kansas Medical Center, May, 1954. Dr. Gianakon is associate professor of pediatrics and psychiatry; director, Child Study Unit, University of Kansas (currently on leave to U. S. Army).

chose to expound their views through the use of creative art and narrative. Their work furnishes graphic support for certain basic insights of this plaguing problem of conscience.

CASE 1

One of these youngsters is a 13-year-old boy. His mother died shortly after his birth, and the responsibility for his care fell to his step-grandmother. She had no children of her own and had married at a fairly late age. She was a strong and dominant person with an intense moral consciousness. She attempted to inculcate these qualities in her step-grandson. The boy grew up full of love, respect, and admiration for her. His one preoccupation was to do the things which pleased her and made her happy.

The one miscalculation in her regimen of training for him was that, in her determined effort to impose a moral sense in the child, she created in him the feeling that whenever he expressed himself in any independent way he was guilty of acting as if he did not love her. So, in him, any desire for self-assertion was equated with the danger of losing the love of the only person who gave meaning to his life. Although the boy possessed wellsprings of creativity and inventiveness, these soon began to wither and dry.

At school he began to be regarded as dull, unimaginative, lifeless, and totally lacking in spontaneity. The teachers knew that he had good intelligence and were increasingly concerned as their every effort to help him use his talents was frustrated. As the boy became aware of his increasing failure to meet the challenges of school, he became depressed and apathetic. Because he was so concerned that his every answer should be correct and without mistakes, he could never finish his school work, even with the simplest of assignments. When his grades reflected this failure, the boy was overwhelmed by the misery in his grandmother's eyes. He withdrew further into himself, did not even attempt to do his work, was continuously tardy; his person was sloppy and untidy, and he gave every outward appearance of not caring about anything. He was a "problem adolescent," an adolescent without a "conscience."

Figure 1

He drew Figure 1.

He commented, "It shows a boy. He is the only one who can see his conscience. His conscience is an angel of good and a red devil of bad. The boy has been listening to and doing what the red devil tells him. That's why the angel has pulled away from the boy. The boy thinks that nobody can tell what he has been doing because they cannot see his conscience. But, the boy's ears are glowing, so everybody knows what he has been up to! I don't know if that's what you want. I really think that this is my grandmother's idea of conscience. I don't know if I have one or not."

In psychiatry, it was formerly considered that an infant was born with the various aspects of his personality structure already present. It was believed that the baby was capable of experiencing complex guilt reactions and other subtle, emotional nuances. Continued and exhaustive infant observation has led most psychiatric authorities to conclude that this is not true.[1]

Current belief is that the infant is born with the potential to grow emotionally, just as he is born, perhaps, with the potential to grow and to develop six feet in height. None has ever proposed that the human infant requires that a portion of his basic personality structure must be "added on" from an outside source. What is required is that the infant be helped and directed so that the "rest-cells" of his personality can develop from within him.

As the case of the youngster we have just considered shows, you cannot "pour conscience into" a person, nor can you "tack it on." We cannot forget this principle when we deal with our troubled adolescents. We cannot "beat conscience into" them. It is not sufficient to lecture them, cajole them, threaten them, or punish them into better modes of behavior. We must furnish the guidance and the type of direction which will allow them to develop these values within themselves.

Physicians are best equipped for undertaking leadership in such an effort because they are trusted by both rebellious adolescents and perplexed, impatient adults. By precept and example, through the integrity of his daily living, the physician can construct the type of model which can be accepted by the adolescent, and can display a type of adult conscience which can become satisfying and rewarding to the adolescent. Medical educators are beginning to recognize the importance of integrity, honesty, and sincerity in young men and women who wish to become

physicians.[2] These are the qualities which medicine must possess to meet this great challenge. It becomes increasingly obvious that the key to the development of a conscience in the adolescent is the development of a conscience in the adult.

CASE 2

The second adolescent with whom conscience was discussed was a 14-year-old girl. The father was a salesman and was frequently away from home. The mother had great anxieties and concerns about her own ability to sustain the responsibility for the family by herself. Her constant thinking was in regard to the father, and she spent all the time when he was away preparing for his return. She spent her time when he was in the family attempting to convince him that he should change his occupation, and that he should devote more time to the family. Many quarrelsome discussions would take place.

Because the mother was so busy preparing for the father's return when he was away, and so busy quarreling with him when he was at home, the child began to feel that she could be noticed only if she were able to stage some form of dramatic and histrionic behavior. She began to talk in an exaggerated and offensively affected manner. She began to dress in startling fashion. She assumed such a pseudo-sophisticated air that she became increasingly repulsive to her classmates and to the school authorities. But she found that her swagger and bravado were still not sufficient to break through the mother's preoccupations. The girl was being increasingly noticed, and labeled, by the community, but at home she still felt that she was only a part of the furnishings.

Finally, in a desperate effort to be noticed by those who were, still, the most important to her, she began to steal. This was against all that she had been taught and against all that she, herself, believed. Her struggle with herself was tremendous. However, the need to be acknowledged by her family was even stronger, so she resorted to stealing large sums of money from her parents. This was a highly successful maneuver, and she quickly gained a great deal of attention. The word spread, and the community rendered the verdict of a "wild, adolescent girl who had been headed for trouble a long time," an adolescent without a "conscience."

Figure 2

She drew Figure 2.

She explained, "This is the hand of greed, and it is reaching out for 'greenbacks.' It's a kind of sickly and awful looking hand. It's just about to get the 'greenbacks,' too, but it gets noticed by Conscience, and she throws her hands up in horror and screams, 'Uh! Uh! Uh!' Maybe she even throws something at the hand to try and stop it."

One cannot overlook the tremendously hysterical tone of this drawing. The histrionics and drama are there for all to see. One gets the impression of a lurid and wild type of illustration. This might be an appropriate poster if Conscience were playing at the local burlesque theater. But, more significantly, it depicts the struggle this youngster feels. This is not a girl who does not care, and who does not think, and who does not feel. This is a girl in conflict. It illustrates that conscience is an individual thing. The type of conscience we have within us is flavored by the type of experience we have undergone in our daily living. Each person has conscience that is unique and that has developed along with every other pattern of behavior.[3] In order to understand, we must study each individual and learn the ingredients that have spiced his personality.

There is really no such thing as an "adolescent conscience." We cannot study the boys and girls who come to us for help by doing research and exploring such a mass phenomenon as the "adolescent conscience." We must, instead, study and explore each individual youngster in order to clarify our thinking and to exercise a wise and mature judgment. Our methods are, presently, slow and cumbersome. They are not readily available to many segments of our besieged population. There are, at present, no general rules and no clear-cut answers. That is why research of an individualized type is necessary.

We must provide the type of facilities in our hospitals which can be devoted to such endeavors. We must insist that equipment, space, and wards must be provided for the study of each individual youngster. We must realistically understand that these facilities cannot service, at this stage, all the problem adolescents, but that the insight that is gained through the study of some will eventually be useful in serving the many. This is the approach that medicine has used with surgery, chemotherapy, heart research, cancer research, and polio research. The method has produced the desired results in instance

after instance. Now we must apply this method to such matters as conscience and personality.

CASE 3

The third adolescent was a 16-year-old boy. His mother was a weak and frightened woman. She felt a failure in whatever she attempted, and she turned to alcohol in an effort to numb her depression. Her boy was left to his own devices, even as an infant. On occasion she would collect herself sufficiently so that she would feed the youngster and care for him. This did not always happen, and the child passed from one severe illness to another. He was hospitalized many times. These were periods of extreme relief for the mother, and the hospital authorities were always faced with the problem of convincing her that the child was well and could be taken home. She would then place him with various relatives so that he could "convalesce." The boy was shuffled from one person to another, never gaining the opportunity to establish a meaningful relationship with any one adult who could serve as a model or who could, at least, provide some pattern of living for the boy.

Because of this tremendous lack of identification, the boy questioned at times whether he actually existed or whether he was just a wisp of smoke in an amorphous world. The only way he could make sure that he was actually an entity was to gauge the effect of his actions upon other people. Therefore, when they would react to him, he reasoned, it was because he was really there, and they had somebody toward whom to react. He made it his career, therefore, to constantly attempt to elicit a response from those about him, in order to reassure himself of his existence.

It did not take him long to discover that doing the things that other people did not like was the most certain method of getting them to react. He would spend a great deal of his time daydreaming in school. Whenever he would be called upon to recite, he would respond with bizarre and inappropriate remarks. He would saunter in and out of classrooms during class periods. To the teachers he was the most bewildering and obdurate pupil in school; to his classmates he was the "queerest, creepiest character" in school. Whenever anyone attempted to reason logically with him, his replies would be so vague, rambling, and irrelevant that even greater misunderstanding and exasperation would develop. The boy was a problem adolescent, an adolescent without a conscience.

He drew Figure 3.

He explained it by saying, "This is conscience, over here. He is a ballad singer. He sings about what goes on because he knows everything. This is a young girl, sleeping on top of a hill. She is dreaming about a handsome Prince Charming. Coming up this side of the hill is a wolf. These crosses are what is in the wolf's mind when he sees the girl. He is

Figure 3

pretty excited. On the other side of the hill is the boy, and he sees the girl. You can't see him very well. He knows the wolf is there, and the boy has an axe with him. He has some thoughts about the girl, too. The wolf can see the boy, and the boy can see the wolf. They can both see the girl. But, neither one of them can see what is in her dream or what the other is thinking about. The girl doesn't see either of them. Conscience, up here, can see everything, and he knows how the story is going to come out. He might be able to change the way it comes out, but he just feels like singing about it, now."

It is not very difficult to arrive at the diagnosis of this youngster. By the unusual content and reasoning he displays, one immediately suspects a dissociated state. If we wished to interpret this production more dynamically, we could quickly point to the possibility that the wolf represents the destructive and "id" forces of the personality. The boy, no doubt, represents the weak and insipid ego which will not be able to overcome the challenge at hand. And conscience, although present and fully realizing what is happening, cannot do very much about it other than sing and observe.

The conclusion we may draw here is the fact that conscience cannot survive and effectively exert its energy unless the remainder of the personality is strong and healthy. Through a steady evolution of thought, medicine has reached the conclusion that it is impossible to separate the mind from the body. The two are one, and any attempt to compartmentalize destroys the integrity of the whole.

In personality, also, we must be aware of this principle.[4] In order to help ourselves to think better, we have divided the personality into three such parts

as ego, id, and super-ego or conscience. But we must not lose sight of the fact that this is not the real case. The personality is more than the sum of its parts, and each section is dependent on the being of the other sections. In order to study and understand the adolescent conscience, we must, at the same time, study and understand the adolescent ego, the adolescent personality, and the adolescent physiology and anatomy.

That is why the medical setting is so tremendously important. It affords the opportunity for specialists in all fields to attempt to correlate, to share, and to integrate the knowledge they obtain, and thus form a significant and total picture which will ultimately solve the problems of the adolescent and of all mankind. Gradually ministers, educators, youth workers —all who are interested in people—are beginning to come to our medical centers and to participate in our work. As we grow to accept such developments and to encourage them in our daily routines and functions, broadening vistas of techniques, and knowledge, and usefulness will be available to us.

SUMMARY

This article has attempted to focus attention on three important considerations in regard to the concept which has been called "the adolescent conscience":

1. Conscience is a value whose beginnings reside in every human infant. It is not something that must be added on, but it is a quality which must be helped to develop from the inside.

2. The development of conscience is an individual experience. It is, to a large extent, influenced by the total experiences of each person. In order to understand a person's conscience, or lack of it, we must understand the entire person.

3. Conscience cannot be separated from the remainder of the personality. Its strength or weakness is dependent upon the strength or weakness of the entire personality.

A plea is made for the provision of hospital facilities which will allow individualized study and research into perplexing problems, such as conscience and emotional illness.

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Some Basic Principles in the Medical Management of Peptic Ulcer

Arthur P. Klotz, M.D.
Kansas City, Kansas

The satisfactory practical treatment of benign peptic ulcer has one main objective as its basis. This basic principle of therapy is the adequate control of free acid in the stomach. Benign peptic ulcer does not exist in the absence of free acid. This fact serves to emphasize the importance of acid in the ulcer problem. The aims in treatment of the internist and surgeon are, therefore, quite understandably similar. It is their approach that differs. In general, what the internist attempts to do medically, the surgeon attempts to do by operation. All methods of currently successful surgical procedures for ulcer are aimed at this fundamental problem of the control of free acid.

The development of gastric surgery for ulcer evolved around the control of the acid-forming capacity of the stomach. Resection of the stomach was finally developed into subtotal gastrectomy with the removal of a large portion of the stomach in order to produce the best long term results. The highly successful and relatively simple operation of vagotomy and gastroenterostomy also meets this fundamental acid problem and does so by providing control of the cephalic phase of gastric secretion.

In general, internists and surgeons agree that all

Dr. Klotz is chief of the Section of Gastroenterology, University of Kansas Medical Center.

patients with uncomplicated peptic ulcer should have thorough, adequate medical management. The main point of confusion seems to lie in the meaning of adequate management. There are three important factors which comprise adequate medical management: (1) effective acid control, which has been alluded to above; (2) a sufficient period of intensive therapy to allow for complete healing of the ulcer; and (3) a change in the living habits and personal philosophy of the patient.

The third factor, briefly speaking, is too frequently slighted, the reaction against it being that any type of ulcer treatment is not successful if the patient is unable to lead a totally uninhibited and unrestricted life after a limited period of medical therapy. Patients with diabetes, heart disease, arthritis, and numerous other ailments have learned to make necessary restrictions in activity and daily routine. The patient with peptic ulcer must also learn to accept his limitations. The attending physician must be certain that the ulcer patient always remains aware of this and, if necessary, he must put forth the extra effort to reindoctrinate him.

CONVENTIONAL MEDICAL THERAPY

Consideration of factor one, "effective acid control," in adequate medical management should be enlarged upon. Success of medical treatment in active ulcer is proportional to the extent of neutralization of free acid. Some commercially available antacid is usually employed. Many controlled clinical studies have demonstrated the comparative neutralizing abilities of numerous preparations. Today, of the many antacids offered for the treatment of ulcer, the physician must choose one which provides effective neutralization and is readily acceptable to the patient. It must not be excessively expensive and must have a minimum of undesirable side effects.

Uninterrupted, 24-hour total neutralization is not an absolute essential for healing of ulcer, but the nearer to this state that treatment can approach, the more confident can the physician be in anticipation of progressive healing. Insufficient or inadequate neutralization, on the other hand, may be frequently responsible for incomplete healing and early relapse. As a result of such failure, there is distrust on the part of the patient and doctor for any success of medical management.

Some ulcers, it should be added, respond to simple therapy, improving no matter which of the many antacids is used. These mild situations, however, are not the subject matter of the present discussion.

Acid neutralizing ability of various substances can be gauged by the resulting gastric pH. Milk and other proteins certainly act as buffers in the stomach. One finds, however, that the pH of gastric contents is relatively unchanged with hourly ingestion of milk, gastric contents remaining highly acid. In order to neutralize the free acidity and raise the pH, it is necessary for the patient to take frequent dosages of effective antacids. Using the pH as a point of reference, it can be shown, for example, that in order to achieve a satisfactory neutralization, one antacid may be required in extremely large dosages to accomplish what another alkali can achieve in small amounts. It may be necessary, for example, to give as much as a full ounce of aluminum hydroxide hourly to cause only a moderate change in gastric acidity to a pH of 3.[1] This fact alone may make a schedule of management using certain antacids impractical and costly.

Of the many antacids available, calcium carbonate does inexpensively in small dosage what the physician desires, that is, elevate the gastric pH to 4 or higher.[2] The powder must be taken at frequent intervals throughout the day, with the addition of magnesium carbonate in appropriate amounts if constipation becomes a problem. A diet with minimal irritants, both chemical and physical, is prescribed in addition. Permanent dietary restrictions may be necessary even after the ulcer crater has healed.

Intensive therapy must be understood, therefore, as adequate control of the pH of gastric contents; a pH approaching 4 or higher is a desirable objective. At times it may become necessary to continue the control of pH throughout the night as well. The patient usually responds promptly on this program,

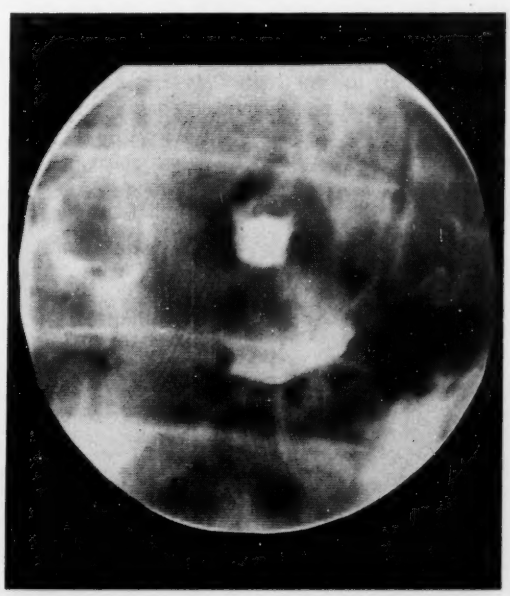

Figure 1. Patient J. L., Case 1. Large "en face" ulcer crater in the duodenal bulb present on admission.

Figure 2. Patient J. L., Case 1, after three weeks of therapy. Patient totally asymptomatic. The original ulcer crater was so large that little decrease in size could be expected in this short time.

becoming asymptomatic within one or two days and remaining so while conforming to this regimen.

Anticholinergic medications have become popular because of their supposed simplification in ulcer management. As with antacids, some are more potent than others. Their clinical effects are variable, and patients may develop tolerance to them. It is difficult to predict the type of response they will elicit. Relying on their use for controlling free acid in the fasting state is at best highly uncertain, and many of the drugs are known to be unsuccessful in controlling the increase in gastric acidity that accompanies eating. They are best used as adjuncts in the over-all management of ulcer.

The second important factor in medical treatment is length of time of intensive therapy. The co-operation of the patient is indispensable. The problem becomes somewhat more complex in complicated peptic ulcer. Rest with hospitalization is sometimes mandatory in management. For example patients with penetrating duodenal ulcers and those with obstruction because of narrowing due to spasm or edema may require several weeks of hospitalization for effective management. This may be illustrated by the following case.

CASE 1

J. L., a 58-year-old white male, entered the hospital with the complaints of periodic abdominal pain of 15 years' duration. One month prior to admission he developed severe epigastric pain, and one week before admission he had intermittent vomiting with pain. X-ray revealed a large ulcer crater in the duodenal bulb (Figure 1). He was placed on strict ulcer management and was aspirated nightly to determine the amount of retention in the stomach. This varied from 360 to 270 cc. and finally decreased to 90 cc. as he improved. It was necessary to keep him at bed rest and to increase the amount and frequency of his powders, continuing them every two hours during the night. He responded to this management.

When he was x-rayed three weeks later, he was totally asymptomatic, but nevertheless there was little change in the size of the ulcer crater as seen by x-ray (Figure 2). He continued asymptomatic. Nine weeks later x-ray revealed deformity of the bulb but no evidence of the ulcer crater (Figure 3).

In this instance of penetrating duodenal ulcer, hospitalization was indispensable. Prolonged, effective acid neutralization was necessary to prevent progres-

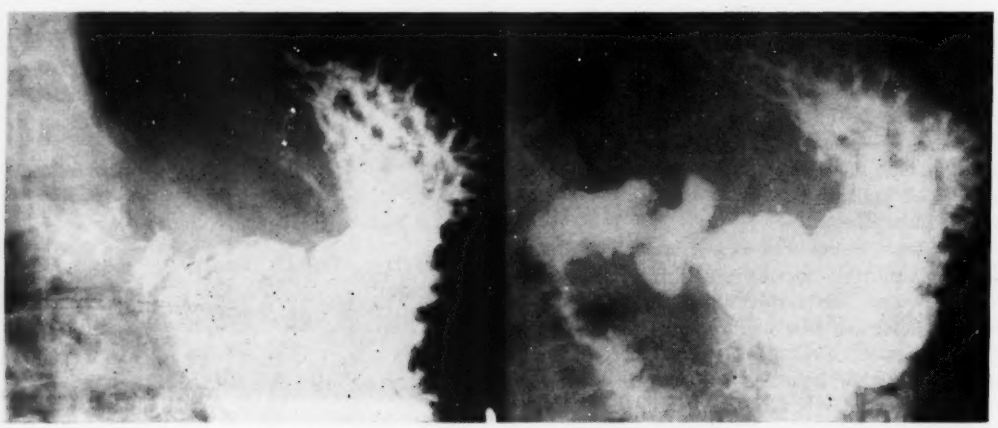

Figure 3. Patient J. L., Case 1, after nine weeks of therapy. Deformity of duodenal bulb is apparent. Crater is no longer visible.

sion of the ulcer and to promote healing. Improvement became apparent as pain decreased and obstruction lessened (determined by regular nightly aspiration measured in cubic centimeters of gastric juice retained). Solid foods were not permitted until spasm and edema were no longer a factor in obstruction.

The ulcer crater was still apparent on x-ray weeks after beginning therapy and disappeared at fluoroscopy only after a long term of management. Even after disappearance of the crater on x-ray films, intensive medical management was continued to insure complete healing. If strict management were not continued in such a case, early relapse could be expected.

Figures 1, 2, and 3 demonstrate the progress in healing of the ulcer as seen by x-ray and emphasize the point that a short period of ulcer management is insufficient to provide complete healing. The original large ulcer crater showed no decrease in size when viewed by x-ray after almost a month of intensive therapy, even though the patient had been asymptomatic for weeks previously.

The question of malignancy does not arise in patients with duodenal ulcer as it does in gastric ulcer. There is, of course, widespread discussion on the possibility of differentiating between a benign or malignant gastric ulcer preoperatively. Careful clinical evaluation should be employed in every case. A malignant ulcer masquerading as a benign lesion is by no means rare. Such deception is not the usual situation encountered, and other features, when recognized, can reveal the true nature of the lesion. The use of all diagnostic measures can help in making this decision in any particular patient.[3] This includes the procedures of careful x-ray examination, with mucosal relief views, repeated gastroscopic examination, and studies on gastric washings for malignant cells. It is often necessary to repeat all examinations several times in the study of any one case.

If a decision cannot be made on the basis of such a careful evaluation, surgery should be recommended. Should a diagnosis of benign gastric ulcer be made and medical management be elected, the patient must be followed carefully by repeated examinations and evaluations over an extended period of time. Perhaps 60 per cent of benign gastric ulcers given intensive and adequate therapy respond satisfactorily to medical treatment.[4] These figures speak for themselves and amply justify an adequate trial of medical management before resorting to subtotal gastric resection.

It has also been suggested that patients with gastric ulcer be given a limited period of medical treatment to determine healing before resorting to surgery. The suggested length of time of this therapeutic trial has varied, but a frequent time interval mentioned has been two or three weeks. Implications here have been that if the ulcer is not healed within this time limit, as demonstrated by x-ray, it is probably malignant and surgery should be done. This is not a good criterion. The following case demonstrates that healing in benign ulcer does not always become evident by x-ray within the first few weeks.

CASE 2

O. L., a 60-year-old white male with amyotrophic lateral sclerosis, was admitted to the hospital with a two-year history of epigastric pain relieved by food. A large 2 centimeter crater of the lesser curvature of the stomach was found at x-ray (Figure 4). This had all of the usual characteristics of a benign gastric ulcer. There was a high free acidity on gastric analysis. Gastroscopy revealed a benign gastric ulcer. X-ray approximately four weeks later showed no appreciable change in the size of the ulcer crater, although the patient was totally asymptomatic (Figure

Figure 4. Patient O. L., Case 2. Large gastric ulcer on the lesser curvature with the usual characteristics of a benign lesion.

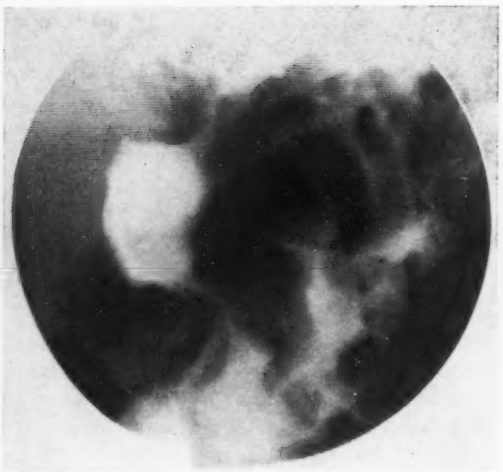

Figure 5. Patient O. L., Case 2. After four weeks of treatment there is practically no change in the size of the ulcer. Benign characteristics are again apparent.

5). At approximately eight weeks, however, there was marked healing, the crater measuring about 7 to 8 mm. in diameter (Figure 6). The lesion was followed gastroscopically to complete healing; a scar pocket at the site of the healed ulcer was found on the final x-ray study. Figure 5 demonstrates no appreciable x-ray evidence of healing at the end of four weeks; Figure 6, on the other hand, demonstrates rather dramatic healing at the end of eight weeks.

Figure 6. Patient O. L., Case 2. Marked healing of the ulcer crater after eight weeks of therapy.

RADIATION THERAPY IN THE TREATMENT OF BENIGN ULCER

Since free acid is such a critical factor in the pathogenesis of benign peptic ulcer, other modes of treatment besides medical management and surgery have been explored. Bruegel in 1917 first tried radiation therapy in peptic ulcer. A carefully-controlled, large series of patients who received radiation therapy permits certain conclusions to be drawn.[5] In the carefully selected patient, it can be demonstrated that radiation therapy to the fundus of the stomach frequently decreases gastric acidity for varying periods of time and often adds to the ease of medical management. Ideal effects of radiation are the development of achlorhydria. The following cases demonstrate the results as shown by clinical results and follow-up gastric analysis.

CASE 3

G. J., age 65, was admitted to the hospital in April 1954 with a story of weakness, vomiting, hematemesis, and tarry stools one month before admission. There was a 20-year history of indigestion and abdominal distress. One week before admission he was awakened regularly with night pain. There was a 15-pound weight loss. X-ray revealed a duodenal ulcer with some gastric retention. A one-hour basal gastric analysis is shown in Figure 7. The

ONE HOUR BASAL GASTRIC ANALYSIS

SPECIMEN	FREE ACID CLINICAL UNITS	TOTAL ACID
FASTING	88	110
1	95	108
2	80	100
3	70	87
4	81	99

G. J. #6791 4-27-54 DUODENAL ULCER

Figure 7. Patient G. J., Case 3. A typical high acid pattern of the basal gastric analysis in a patient with active duodenal ulcer.

high levels of free acid as shown in each specimen are typical for duodenal ulcer.

The patient was placed on ulcer management of milk and cream and calcium carbonate powders hourly and became completely asymptomatic within a few days. He was discharged but did not continue his management after leaving the hospital. He was readmitted in September because of recurrent pain and vomiting with nocturnal distress. A few days after admission he passed a grossly tarry stool, and blood transfusion was necessary to maintain his blood pres-

sure. Anticholinergic drugs were added to his program. His complaints gradually subsided by the sixth day, and radiation therapy was instituted. He was given a total depth dose of 1600 r to the gastric fundus, which he tolerated without any distress. Twelve days after the completion of radiation therapy, a two-hour gastric analysis revealed the results shown in Figure 8. The basal hour revealed no free acid in

TWO HOUR GASTRIC ANALYSIS
(POST IRRADIATION THERAPY)

SPECIMEN	VOLUME	FREE ACID CLINICAL UNITS	TOTAL ACID
FASTING	8 cc.	0	2
1	21	0	2
2	4	0	0
3	6	0	1
4	5	0	<1
HISTOLOG STIMULATION			
1	5	0	17
2	20	0	21
3	21	11	32
4	12	0	25

G. J. #6791 10-27-54 DUODENAL ULCER

Figure 8. Patient G. J., Case 3. After radiation therapy there is absence of free acid in the basal hour. Free acid was obtained only after intense maximum stimulation with Histolog.

any specimen, and only after maximum, intense stimulation by Histolog injection was any acid obtained in the second hour.

He was called back two months later for re-x-ray and repeat gastric analysis. He volunteered that he had never felt better in many years. The x-ray demonstrated marked disappearance of the cloverleaf deformity that was present before radiation. In most of the views the cap appeared normal; there was no tenderness or irritability of the bulb. The results of gastric analysis are recorded in Figure 9.

TWO HOUR GASTRIC ANALYSIS
(POST IRRADIATION THERAPY)

SPECIMEN	VOLUME	FREE ACID CLINICAL UNITS	TOTAL ACID
FASTING	4 cc.	0	0
1	<1	QNS	QNS
2	0	0	0
3	0	0	0
4	0	0	0
HISTOLOG STIMULATION			
1	1	0	5
2	5	7	29
3	3	13	20
4	3	16	27

G. J. #6791 12-15-54 DUODENAL ULCER

Figure 9. Patient G. J., Case 3. A repeat gastric analysis approximately nine weeks after completion of x-ray therapy.

CASE 4

Another patient, G. T., age 47 years, was treated in the same fashion by x-ray therapy. He was admitted in March of 1954 with a history of epigastric pain of 19 years' duration. Ten days prior to admission he developed severe abdominal pain associated with vomiting and was admitted to the hospital. X-ray revealed a marked deformity of the duodenal bulb. Results of a one-hour gastric analysis are shown in Figure 10. Again the high free acidity of the

ONE HOUR BASAL GASTRIC ANALYSIS

SPECIMEN	FREE ACID CLINICAL UNITS	TOTAL ACID
FASTING	59	67
1	46	56
2	64	72
3	71	81
4	76	86

G. T. #8871 3-25-54 DUODENAL ULCER

Figure 10. Patient G. T., Case 4. The gastric analysis reveals the high free acid expected in duodenal ulcer.

fractional samples is apparent. He was placed on ulcer management and rapidly became asymptomatic. A 10-day course of radiation to the fundus of the stomach was given. There was slight nausea toward the end of the period, but he had no other complaints. Three weeks after the completion of x-ray therapy, a two-hour gastric analysis revealed the results shown in Figure 11. He has remained asymptomatic.

TWO HOUR GASTRIC ANALYSIS
(POST IRRADIATION THERAPY)

SPECIMEN	VOLUME	FREE ACID CLINICAL UNITS	TOTAL ACID
FASTING	17cc.	0	6
1	21	0	6
2	20	0	12
3	22	0	10
4	18	0	6
HISTOLOG STIMULATION			
1	30	0	19
2	46	37	54
3	36	42	56
4	58	41	58

G. T. #8871 6-16-54 DUODENAL ULCER

Figure 11. Patient G. T., Case 4. Results of the gastric analysis three weeks after completion of radiation therapy. Free acid obtained only after intense stimulation with Histolog injection.

DISCUSSION

It cannot be overemphasized that the diagnosis of peptic ulcer must be carefully established. All too frequently functional disorders of the colon are mistakenly labeled peptic ulcer. This component in any patient's case must be recognized and treated accordingly. The treatment of functional disorders of the gastrointestinal tract is quite different from the treatment of peptic ulcer. Once the diagnosis of peptic

ulcer has been made, the success of medical treatment has been directly proportional to the extent of control of the acid gastric juice over weeks and months of therapy. Proper treatment instituted at an early date usually is the best guarantee of satisfactory response.

Some failures of medical management in peptic ulcer may be ascribed to treatment that is too short to allow for complete healing. A too rapid liberalization of diet without carefully chosen restrictions may be at fault in others. Another commonly encountered cause of failure in treatment is the disinterest on the part of the patient in following strict management after he begins to feel better with the disappearance of his symptoms.

Continued, sustained, intensive therapy must be insisted upon by the attending physician. Constant co-operation on the part of the patient may sometimes be achieved if the physician will initially take time to describe reasons underlying the medical program chosen and to discuss the long-term benefits of permanent changes in mode of living and diet. The patient with this measure of understanding is benefited and more readily follows the restrictions which he knows keep him free of ulcer distress.

SUMMARY

1. Satisfactory medical management of peptic ulcer is based upon effective, prolonged neutralization of gastric acidity.

2. Patients with uncomplicated gastric or duodenal ulcer should have a thorough and adequate trial of intensive medical management before surgery is recommended.

3. Radiation therapy to the fundus of the stomach provides an additional effective means for treating peptic ulcer in the carefully selected patient.

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Management of the Chronic Alcoholic

Ebbe Curtis Hoff, Ph.D., M.D.
Richmond, Virginia

May I say how happy I am to respond to your invitation to participate in this postgraduate medical study sponsored by the University of Kansas in cooperation with The Kansas Medical Society and the Kansas State Board of Health.

My assignment today is to present to you what must be, by virtue of the limitations of time, a rather abridged survey of modern developments in the management of chronic alcoholics. This topic is most timely since the problem of chronic alcoholism is a major one in our society today—not only in the number of people involved but also in the extent of damage done in terms of financial loss and human suffering. We encounter alcoholism more and more as a problem within that large so-called middle class that we think of as the solid, stable backbone of our nation. The state of Kansas, in common with a majority of the other states of the union, is taking special cognizance of alcoholism, and we are to listen this afternoon to a report by Mr. Lewis W. Andrews on the activity of the Kansas State Commission on Alcoholism.

Concern for alcoholics from the medical viewpoint is by no means new. Fifty years ago, for example, much attention was focused by psychiatrists and internists upon this problem in its etiological and therapeutic aspects, especially on the continent of Europe. For a variety of reasons, activity in this field subsequently dwindled. For many years physicians appeared to have contact with alcoholics, in large part, only in administration of symptomatic treatment and in therapy designed to handle specific complications of alcoholism, such as liver dysfunction, Wernicke's encephalitis, and Korsakoff's psychosis. The comprehensive approach to the problem by some of the continental investigators of alcoholism was often overlooked. Many physicians preferred not to have anything to do with alcoholics as patients. It was

Read at postgraduate medical course, University of Kansas Medical Center. Dr. Hoff is professor of neurological science, Medical College of Virginia, and is medical director of the Division of Alcohol Studies and Rehabilitation, State Health Department, Commonwealth of Virginia.

found that a therapeutic onslaught on presumed etiological bases did not always arrest the drinking; in fact, therapeutic efforts were frequently disappointingly unsuccessful.

The last 10 or more years have seen a remarkable reawakening of activity in this field; and, especially at the state level, a large number of treatment and rehabilitation centers has been established and research investigation has been sponsored. This renewed interest, in a large measure, is the outcome of the pioneer work of the Yale Center on Alcohol Studies and the phenomenal growth of Alcoholics Anonymous through which thousands of alcoholics have been able to attain sobriety and restoration to useful, satisfying, and productive lives.

We are still far from a fully adequate understanding of the medical, social, and psychological dynamics of alcoholism. Many alcoholics, it is true, stand out as immature, insecure individuals, and yet not every mentally or emotionally troubled person becomes an alcoholic. Not every alcoholic presents a clearly discerned pre-alcoholic history of mental or emotional disturbance. As the condition runs its course, all alcoholics become troubled, nervous and upset. Sherfey, analyzing a group of alcoholics, has recently reported that about 40 per cent of the patients suffered from well-defined psychiatric illnesses, while in about 60 per cent no definite psychiatric diagnosis could be established, although the patients showed various constellations of psychological instability or inadequacy.

Although alcoholics are a ubiquitous group in a judge's court, a personnel counselor's or clergyman's study, or in a physician's practice, they do not exhibit a single, typical, exclusive pattern of physiological, psychological, or social symptomatology and behavior. Alcoholism stands out as a unifying symptom in a diverse collection of people whose sickness is protean, complex, and often intractable. Many alcoholics reveal evidence of serious failure of maturation with dependency at an oral level. There are those with an outstanding picture of psychosexual inadequacy. We see schizoid patients and those with manic-depressive tendencies who become alcoholics and those with psychopathically and sociopathically inadequate personalities. In fact most, if not all, of the psychiatric diagnostic categories have been utilized in our attempts to denominate the alcoholic's illness.

Chronic alcoholics present multiple symptoms; in simple terms, the alcoholic may be said to be "sick all over." His condition involves medical, psychological, domestic, economic, and social disturbances. Each one regards himself as a special case, different from others.

Modern interest in the care of alcoholics and the pathological processes in alcoholism has inspired serious efforts at understanding and classification of this baffling group of unhappy folk, study of their possible psychological, biochemical, and psychiatric peculiarities, and special techniques for their rehabilitation. This interest has brought together basic biological scientists, psychologists, social workers, sociologists, internists, and psychiatrists, in collaboration. Much has been learned, and we owe a great deal to the help and co-operation of general practitioners of medicine.

There have been many failures and some successes, enough of both to encourage further endeavor. Many questions still demand answers. The psychologist, for instance, would like to know to what extent pre-existing psychological abnormalities constitute an etiological source. Biochemists and internists are wrestling with the problem of the possible role of hormonal imbalance and genetically transmitted metabolic deficiencies as causative factors in alcoholism. Psychiatric research is again struggling with the problem of psychopathological factors in alcoholism from the vantage point of modern advances in psychiatry. It may turn out that in most, if not all, alcoholics, we have to deal with a complex and multiple etiology with a number of factors operating.

On the other hand, it is just possible that some fairly simple underlying causative factor common to all alcoholics may be uncovered. If this happens, therapy will be revolutionized in the direction of great simplification. Until that time, no treatment is adequate that does not envisage a comprehensive, many-sided approach to the patient's problems. Insofar as possible, the therapeutic approach must be based upon the soundest possible knowledge that we have, at present, of the dynamics of the condition and the most skillful, inclusive diagnosis that we can make. Since it is apparent that our knowledge of these dynamics is faulty, alcoholism is recognized as a valid field of research in the basic medical sciences, psychology, internal medicine, sociology, and psychiatry.

Our own Division of Alcohol Studies and Rehabilitation of the Commonwealth of Virginia has been structured upon the desire to provide the comprehensive care we have just been discussing. Since the establishment of the Division in October, 1948, we have admitted just over 2,000 patients. Our treatment facility consists of a ward within one geographical locality in the Medical College of Virginia Hospital, outpatient clinic facilities within the same location in the Medical College of Virginia, and another clinic in the more western part of our state at Roanoke.

Our activity is one of the Divisions of the State Department of Health and is linked, by the law establishing our division, with the Medical College

of Virginia, which is one of our two state medical schools. The establishment of the program within the State Department of Health, sponsored by general funds, accords recognition of the problem of alcoholism as a public health responsibility of the people as a whole. It also permits us to make use of the high degree of organization and state-wide distribution of facilities of the health department.

Our integration within the Medical College of Virginia affords us the advantage of a free flow of cross-referrals and cross-consultations between our division and other departments of the school of medicine and the teaching hospital. Our development within the medical college has enabled us, in addition, to initiate and maintain laboratories and staff for the conduct of basic research. Indeed, we feel that it would be difficult, if not impossible, to design a fully comprehensive program entirely unrelated to a medical center for teaching and research.

The Virginia program is a pilot study. In the six years since the legislative act establishing our division in 1948, our principal experience has been with a therapeutic plan involving initial hospitalization for a relatively brief period of eight days to two weeks, followed by individualized therapy in one of our outpatient clinics for at least a year's time. We accept patients on a voluntary basis. Any resident of the state may seek treatment and may be charged no more than the actual cost. We have never refused first admission to any applicant because of inability to pay. For any patient unable to pay the costs of treatment at once, a plan of installment payment is worked out as a part of his program of rehabilitation. Payment of treatment costs is stressed as a necessary part of recovery of responsible status in the community. In practice, we find that patient repayments amount to somewhat more than 40 per cent of actual hospitalization and clinic costs.

Of the 2,016 patients accepted for treatment through the end of October, 1954, 88.5 per cent are men and 11.5 per cent are women. Of these, 31.6 per cent were referred by physicians (mostly general practitioners), 6.6 per cent by courts, 2.7 by social agencies, 2.5 by clergymen, 11.1 by Alcoholics Anonymous, 7.6 by the spouse, 13.1 by other relatives, 11.6 by friends (often former patients), and 3.3 by others. We find that 9.9 per cent are self-referred.

It has been our experience that patients referred by physicians, social agencies, courts, and clergy tend to have the most favorable clinical course. Those referred by Alcoholics Anonymous show a good recovery rate. Patients referred by the wife or husband have the poorest rehabilitation record.

Factors responsible for these differences are complex. A significant factor in the case of those referred by the spouse is defective motivation on the part of the patient himself. We believe that the superior record of those referred by physicians and other objective referral sources stems, in part at least, from the skill of the physician, social worker, judge, or clergyman in pre-selecting those suitable for rehabilitation in our service.

Our accepted patients range in age from under 20 to over 60. If we divide the patients into five-year age groups, we find that the group of males from 36 to 40 contains the largest number; for the women, the peak occurs in the 31- to 35-year group.

We believe that the process of intake is highly important. We give each applicant a preliminary interview in which he is accorded an opportunity of talking over his problems with a physician who is accepting, non-condemnatory, and willing to listen with respect. The prospective patient has a chance to express his motivations, his failures, and his doubts. We do not try to persuade the applicant to seek admission, but we discuss with him our plan of treatment in an attempt to help him to see his own situation more realistically and make up his own mind. Sometimes an applicant will decide that he really came only because his wife wanted him to do so. Such a man may, after the interview, say he wishes to go home and think it over further. In a month or so we may see him again, this time well motivated to accept treatment based upon a realization of his own need for help. In practice, we accept about 90 per cent of all who come for interviews. The other 10 per cent are usually recommended for treatment by mental hospitals, private sanitoria, or private psychiatrists.

All of our patients give histories of progressively serious difficulties related to uncontrolled drinking, usually for several years. Most have received previous treatment for alcoholism in private sanatoria, state hospitals, or from private physicians. Most have been drinking heavily within a day prior to admission. Every effort is made to admit accepted patients on the day of their application interview, and generally this is possible. We usually have a waiting list of applicants, but we find that if a patient cannot be admitted within two or three days he tends to seek help elsewhere. If our service is full, we give suggestions and advice to the referring physician for private, home care of his patient until a bed becomes available. This often serves to lower the decay rate of the waiting list and insures admission of many who would otherwise drop out at the start.

In the hospital, all patients receive medical, psychological, psychiatric, and social work-up as indicated. Therapy includes necessary medical care as well as group psychotherapy during the hospital stay, followed by individual psychotherapy and other care in the outpatient clinic. Patients occupy two-bed

rooms, and the service is planned and organized for group living. If the patient is out of a job or having difficulties in his work, or if there are domestic difficulties, these are handled by counseling with employment counselors or our psychiatric social workers. Members of the patient's family, employer, clergyman, domestic relations judge, or other concerned persons are drawn into the therapeutic situation when desirable and when the patient is agreeable. In all therapeutic planning, the active, central role of the patient is kept foremost. In successful treatment, the patient realizes that he "carries the ball" and is not a passive subject being "worked on."

Medical examination is thorough and includes renal and hepatic function tests, blood studies, x-ray, and electrocardiogram. Fasting blood sugar is measured in all patients, and the electro-encephalogram and other special procedures are done as needed. Our own medical and psychiatric staff usually finds it possible to make diagnoses, but we regularly seek consultation from other departments, notably, neuropsychiatry, medicine, surgery, neurosurgery, gynecology, orthopedics, physical medicine, and the dental school. During hospitalization, many patients undergo corrective surgery, treatment for neglected gynecological conditions, or dental restoration. We regularly diagnose such a condition as diabetes and initiate treatment. A survey of our findings and recommended treatment is sent to the patient's family physician when the patient leaves the hospital.

If the patient is qualified, physically and mentally, to receive disulfiram (antabuse), this is started while he is in the hospital. It is our usual recommendation that he continue to take disulfiram daily (usually 250 mgm.) for at least a year.

We work closely with Alcoholics Anonymous. Members of A.A. lead a group discussion session each Monday evening in our ward, and patients attend A.A. meetings in the community while in the hospital. Members of A.A. call for patients in cars and take them to the meeting. Also, with the permission of the patient, we write to the secretary of the local A.A. group nearest the patient's home asking that a member of A.A. call on the patient when he goes home. Through these means, a large proportion of our patients join A.A., and over the past six years we have found that many of our old patients have become leaders in A.A. groups throughout the state.

We find that 84.5 per cent of our patients persist for a longer or shorter period of time in outpatient therapy. Our records show that 7.1 per cent discharge themselves during the inpatient period. A further 9.4 per cent cannot be traced although they completed the inpatient phase of treatment.

Each patient is assigned to one particular physician who follows him in the outpatient clinic and directs any continuing social work, domestic rehabilitation, job placement, and other therapy.

In evaluating results of treatment, we have used a number of criteria—medical, psychiatric, and social. One criterion that permits quantitative, mathematical handling is abstinence from alcohol. This criterion has several defects, one of which is the exclusive emphasis it places upon drinking as a factor in the patient's total problem. Using the abstinence record, we find that 25.7 per cent of our patients have been completely abstinent since the onset of therapy. An additional 15.2 per cent have maintained sobriety after one relapse; 24.2 per cent have had more than one drinking episode but have shown improvement as measured by better family, economic, and community adjustment. In 14.8 per cent of the patients, there has been no improvement. We discern a small group of 3.6 per cent, previously placed in the unimproved category, who have subsequently maintained abstinence for at least six months. Thus, 68.7 per cent of all our patients may be said to have shown some measure of improvement.

Of the disulfiram patients, 76.3 per cent have benefited by treatment, while 55 per cent of those who did not take disulfiram are classified as improved. This difference is statistically significant (as measured by t-tests of significance). We have found that male patients do significantly better than females.

Our earlier studies, published in 1953, revealed consistently poorer results for patients under 30 in both the disulfiram and control groups. Our present, more complete, longer-term studies now indicate that the under 30's have nearly but not quite so good a record as the whole group. Of the five-year age categories where significant percentages may be derived, it appears that the disulfiram group between 40 and 44 made the best score (79.4 per cent improved out of 219 cases).

Investigation of our statistics reveals the striking fact that the disulfiram group has a much better record of outpatient follow-up and contact with the clinics than do the controls. A major function of disulfiram may, therefore, be to differentiate more highly from less highly motivated patients, to select those who will continue treatment more faithfully, and to provide additional incentive for continuation of treatment. Examining this point statistically, we have found *no* significant difference between the scores of the disulfiram and control groups if we eliminate those who dropped out of treatment early or broke contact later.

Disulfiram holds various meanings for patients. Our clinical judgment suggests that for individual patients, disulfiram has meaning that is contributory

to a favorable course. We would conclude, therefore, that disulfiram is a useful adjunct in a comprehensive plan of therapy of patients amenable to voluntary treatment.

As stated, our own experience has been mostly with patients suitable for voluntary care. Motivation is a major element in success. Our experience shows that motivation can be studied as to quality and can be developed, maintained, and improved by skillful management.

At present a special study commission in Virginia is working on plans for expansion of our state program for alcoholics. My own thinking is that the most favorable pattern involves outpatient clinics to which private physicians and others refer patients, these clinics to send patients to a central unit located in each of our two state medical schools for comprehensive work-up and initiation of an individualized treatment plan. From the central units, patients would return to their own community clinic for long-term outpatient follow-up. For special care of those cases requiring commitment, I believe consideration should be given to the possibility of special facilities where more extended institutional care may be offered.

In conclusion, I think it may fairly be said that the treatment of alcoholics gives promise if based upon a comprehensive plan of action—utilizing our newer knowledge in the basic sciences, internal medicine, psychology, sociology, and psychiatry. Our efforts for the rehabilitation of alcoholics must be integrated with sound research and these, in turn, with forward-looking action toward prevention.

Congenital Pulmonary Arteriovenous Fistula

Fethi Gonlubol, M.D., and E. Grey Dimond, M.D.

Kansas City, Kansas

Since the first description by Churton in 1897, pulmonary arteriovenous fistula has been recognized as a clinical entity. The historical development of our present knowledge about this subject has been summarized in Table I.

We are presenting another case of pulmonary arteriovenous fistula cured by surgical resection of the fistula.

CASE REPORT

E. G., a 19-year-old white male student, entered the University of Kansas Medical Center on June 8, 1954, with the chief complaint of having "too much blood." With the exception of having been told by several laymen that he had blue lips and blue-dusky fingernails, he denied any specific symptom. About three weeks prior to admission, because of the cyanosis observed by his local physician,* the patient was referred to the K.U. Medical Center for evaluation.

The only positive findings in the past history were chickenpox, mumps, measles, and tonsillectomy. Family history was not contributory.

Physical examination: Blood pressure 130/100 mm. Hg., pulse 88 per minute, and respiration 18 per minute. Positive findings included healed central chorioretinitis of the right eye with similar peripheral lesions in each eye. Lips and mucous membranes were cyanotic. Chest was clear to palpation, percussion, and auscultation. However, after exercise a minimal hum over the right mid-axillary region was heard. This was accentuated in inspiration.

Laboratory examination: Urine was acid, specific gravity 1.021, albumin and sugar negative; microscopic examination showed 5-8 pus cells per high power field; hematocrit 70 per cent, red blood count 9.3 million, hemoglobin 19.6 grams or 126 per cent of normal; white blood count was 7,300 with 75 per cent polymorphonuclear leucocytes, 12 per cent lymphocytes, 1 per cent eosinophiles, 12 per cent monocytes; platelets 170,000 per cmm.; serologic test negative for syphilis; fasting blood sugar 71 mg. per 100 cc.; serum sodium, potassium and chloride were normal; CO_2 combining power 21.4 mEq./liter; blood urea nitrogen 12 mg. per 100 cc.

Total blood volume was 122 cc. per kg., total plasma volume 35 cc. per kg., and total red cell mass 87 cc. per kg. Average normals are 70-85, 40-48, and 30-37 cc. per kilogram body weight, respectively. Arterial oxygen content was 15.7 per cent or 64.3

From the Cardiovascular Laboratory, University of Kansas Medical Center.

* L. L. Huntley, M.D., Washington, Kansas.

per cent saturated. Roentgenographic and fluoroscopic examination of the chest revealed a normal size heart with definite pulsation of the right pulmonary artery and an area of infiltrative shadow in the right middle lobe extending to the hilum. This measured 5 by 7 cm. in size (Figure 1).

An angiocardiogram by injection of 40 cc. Diodrast into the right antecubital vein was performed (Figure 1), and six films were taken in the ensuing four seconds. This demonstrated an arteriovenous fistula in the right lung base.

On the 10th hospital day, right middle lobectomy was performed.* Immediately after surgery, the cyanosis disappeared. The hematocrit gradually decreased, being 49 cc. on the 8th postoperative day. Arterial oxygen saturation rose from the original level of 64.4 per cent to 91.4 per cent, determined six days after pneumonectomy.

Pathology study:** The surgical specimen weighed 55 Gm. On section, two groups of well demarcated, about 2 cm. thick, bullous areas were present which were separated from the surrounding tissue. The cystic bullae varied from 0.3 to 1 cm. in diameter. An artery and a vein to the superior group and a vein to the inferior group were traceable. Arterial supply to the inferior group was not demonstrated. Microscopic examination showed that the large vascular spaces seen grossly had extremely thin fibrous walls, contained varying amounts of elastic tissue, and were endothelial lined. They were poorly supported by the surrounding stroma and represented both arteries and veins.

* Creighton Hardin, M.D.
** James O. Boley, M.D.

GENERAL DISCUSSION

Pulmonary arteriovenous fistulae are not a commonly seen condition. For instance, Jennes found no case in examining 14,532 autopsies in Johns Hopkins Hospital from 1936 to 1945. Also Sesson *et al.* found only one case among 19,415 autopsies in the same hospital. It is more common in men than in women. The onset of symptoms varies. It is most commonly recognized in the second and third decades of life.

The most common findings are cyanosis, clubbing of digits, dyspnea on effort, and polycythemia. Cyanosis is present in almost all cases though it may not be detected clinically. The onset can be early or late, abrupt or progressive. Squatting may occur. Clubbing is frequently seen but may not be present. Red blood counts up to 11.4 millions with hemoglobin of 180 per cent and hematocrit up to 90 per cent have been described. In a recently reported case, by Hultgren and Gerbode,[8] it is interesting to note that the patient's platelets count rose from 50,000 per cmm. to 132,000 after the resection of the pulmonary arteriovenous fistula.

Total blood volume is also increased, primarily due to increased red cell mass. This is contrary to the systemic arteriovenous fistulae in which increased blood volume is primarily due to increased plasma volume, and red cell mass is usually normal.

Hemoptysis was seen in about one-fifth of the

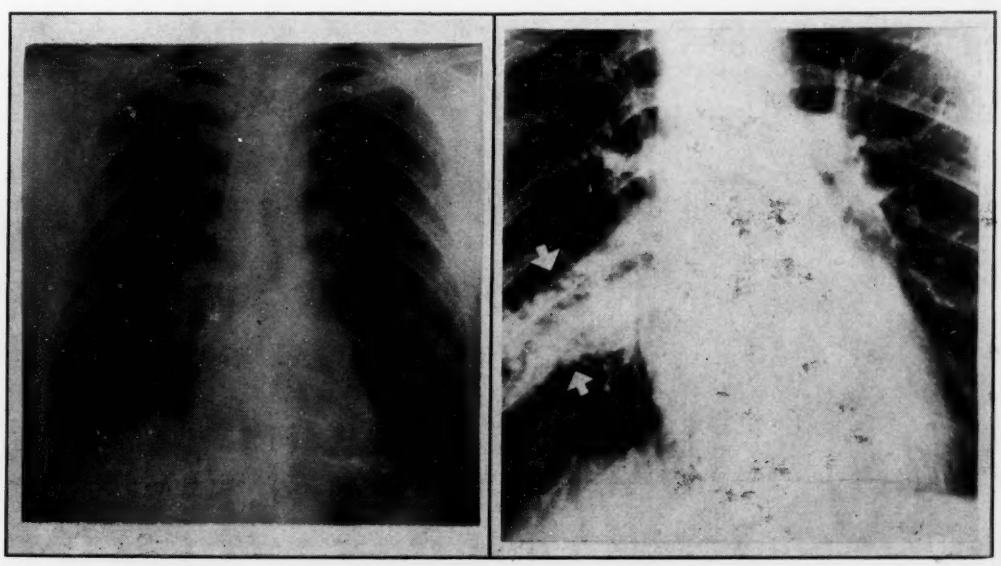

Figure 1. Film on right is routine chest plate with arrows indicating site of fistula. Film on left obtained during angiogram with fistula demonstrating opacity.

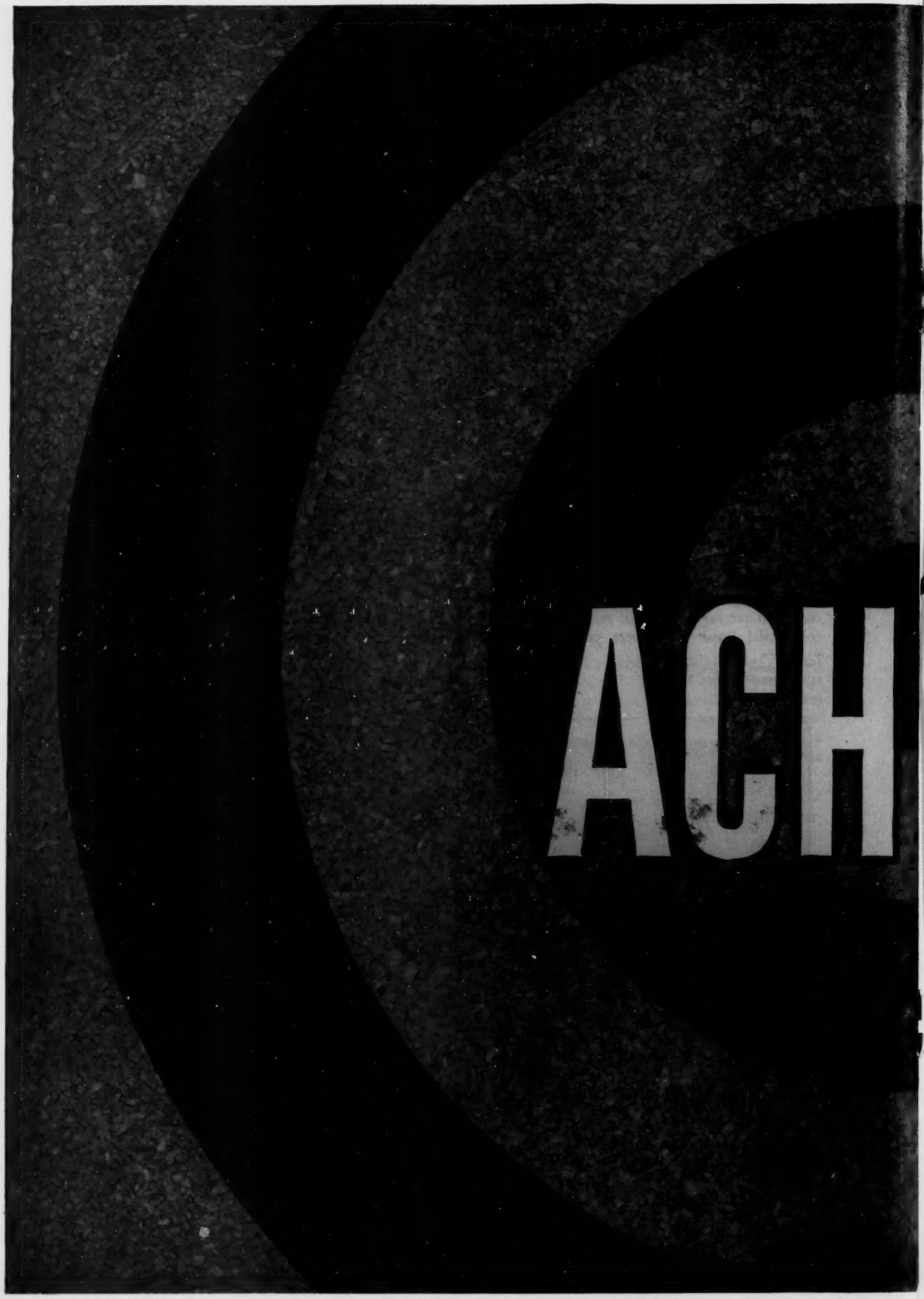
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TABLE I

HISTORICAL REVIEW

Author	*Year*	*Remarks*
Churton	1897	12-year-old male. Roaring pulmonary systolic bruit, accentuated P_2, and episodes of epistaxis and hemoptysis during life. At necropsy, four aneurysms of the secondary branches of pulmonary artery in one lung and three in the other lung were found.
Wilkens	1917	23-year-old female with cyanosis, clubbing, and bruit in the chest who died from hemothorax. Autopsy showed multiple aneurysms of right middle, right lower, and left lower lobes.
de Large and de Vries Robles	1923	10-week-old infant with dyspnea and convulsions. Autopsy showed multiple "hemangioma" of the lung, three in right upper and two in left upper lobe.
Reading	1932	4-year-old female with cyanosis since birth, clubbing, weakness, bruit in the chest, 102 per cent Hb and 6.7 million red cells. Died from brain abscess. At autopsy multiple "telangiectasia" of the left lung were found.
Bowers	1936	2-day-old male with dyspnea who died from hemothorax. At autopsy multiple "hemangioma" in right and left lung were found.
Rodes	1938	25-year-old male with dyspnea, cyanosis, clubbing, hemangiomas of lips, chest pain, and convulsions, Hb. 118 per cent, RBC 7.54 million. Died from a sudden pulmonary hemorrhage. At autopsy multiple cavernous hemangioma of right and left lung were found.
Smith and Horton	1939	40-year-old male, cyanotic since birth. Clubbing, dyspnea, vertigo, distress in the precordium, numbness of hands and feet, bruit in the chest were present. Diagnosis of arteriovenous aneurysm of the lung was made by angiocardiogram.
Hepburn and Dauphinee	1942	23-year-old female with cyanosis, clubbing, dyspnea, Hb. 146 per cent, RBC 9.6 million, arterial oxygen saturation 73 per cent, hematocrit 80 cc. Hemangioma of right middle and right lower lobe. Patient was cured by right pneumonectomy.

reported cases and in two of the cases was the cause of death.

Epistaxis is an even more frequent finding, occurring in about one-third of the cases. This may be an early or late symptom. Both hemoptysis and epistaxis are apparently due to hemangioma or telangiectasia of the nasal mucosa or bronchial tree.

Hemangioma or telangiectasia of mucous membrane or skin is also common and was present in about half of the reported cases. Most frequently affected areas are the lips, skin of the face, ears, retina (in five cases), and tongue. In two of the cases, cavernous angioma of the liver (in one of which angioma of the stomach was also present) was found in the post-mortem examination.

The relationship between pulmonary arteriovenous fistula, Rendu-Osler-Weber disease, heredito-familial angiomatosis or hereditary hemorrhagic telangiectasia has been discussed by several authors and will not be reported here.

Fainting is a relatively common finding, and convulsions, cerebrovascular accidents, and numbness of extremities have been described (Lindgren,[9] Watson,[10] Baer *et al.*,[11] Yater *et al.*[12]). Cerebral air embolism has been claimed to be responsible for some of the neurologic findings, and even "during the operation, before the lung had been touched by the surgeon's knife, air-bubbles could be identified in the vessel of the angioma" (Giampalmo[13]). However, it is unlikely that air embolism is responsible for all of the neurologic findings. Anoxia and small cerebral thrombosis because of the polycythemia may play a role in some of the cases.

Cardiac arrhythmia with Stokes-Adams attacks has been described (Ronald[14]).

On auscultation, a hum or a continuous murmur over the chest corresponding to the fistula may be heard. This is usually accentuated in inspiration.

Roentgenograms have a diagnostic value and in most of the cases show circumscribed lesions in the chest. Fluoroscopic examination of the heart usually reveals no abnormalities. The taking of an angiocardiogram is the procedure of choice for the diagnosis of this condition and gives the characteristic picture of arteriovenous fistulae of the lung.

The condition can be differentiated from congenital cardiac anomalies of cyanotic type, polycythemia vera, pulmonary tuberculosis, and the other pulmonary lesions by means of clinical finding, laboratory procedures and especially angiocardiogram (unless the lesions are multiple, very small, and scattered over the lungs).

Treatment is primarily surgical either by resection of the fistula, lobectomy, or pneumonectomy if necessary.

PHYSIOLOGICAL STUDIES

With the exception of decreased effective pulmonary blood flow and arterial oxygen desaturation, cardiac catheterization findings are essentially normal in most cases of pulmonary arteriovenous fistulae. However, catheterization is useful for calculation of the degree of shunt and to rule out congenital cardiac anomalies (or the presence of both in combination). This is not a necessary diagnostic procedure and by angiocardiography all necessary information, including location, size, and number of lesions, can

be obtained. For this reason in this patient, angiocardiography was preferred to catheterization.

In systemic arteriovenous fistulae, cardiac output is increased in proportion to the size of the fistula, as a result of decreased total peripheral vascular resistance and increased venous return which leads to increased cardiac output. In pulmonary arteriovenous fistulae, on the other hand, cardiac output has been found to be within the normal range in most cases, unless the fistula is large and decreases the total pulmonary resistance markedly. This difference in effect of the peripheral and the pulmonary arteriovenous fistulae on the circulation can be explained on the basis of the pressure differences in the arterial and venous sides of the fistula and because of the difference in the total pulmonary and peripheral vascular resistances (Figure 2).

In the systemic arteriovenous fistula, the shunt is between the systemic arterial circulation of high pressure and the systemic venous side of low pressure. On the other hand, in pulmonary arteriovenous fistula, the shunt is between the low pressure pulmonary arterial bed and the equally low pressure pulmonary venous bed. As the degree of shunt through a fistula depends upon the pressure differences between the arterial and the venous sides of the fistula, we can anticipate that fistulae of the same size (anatomically) in the systemic and the pulmonary circulation will result in a shunt of blood through the systemic opening several times greater than through the pulmonary bypass. The effect on cardiac output is apparent.

Attempts to measure the resistance to flow offered by the pulmonary arteriovenous shunt have been made, especially by Friedlich, Bing, and Blount.[15] Conclusions reached by them are open to some question inasmuch as the sum of the resistances (shunt resistance and remaining pulmonary resistance) was greater than the measured total pulmonary resistance. The error in the mathematics seems to be in their assumption that shunt resistance=$\frac{\text{Mean PA-PV}}{\text{Shunt flow}}$ and that remaining pulmonary resistance=

$$\frac{\text{Mean PA-PV}}{\text{Effective pulmonary flow}}$$

In each formula the mean PA pressure was recorded, but the PV pressure was assumed. This assumption, that the PV pressure indicated the distal resistance in both the shunt and the normal lung, is probably not justified.

SUMMARY

A case of pulmonary arteriovenous fistula, identified by angiogram and cured by surgery, is presented.

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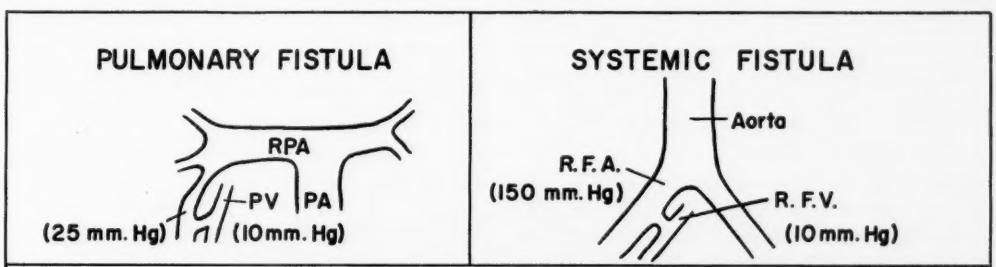

Diagrammatic illustration of the greater A-V pressure difference in the systemic bed, accounting for the greater venous return and consequent increase in cardiac output with resultant cardiac hypertrophy. The blood volume increases in each case: because of increased plasma volume in systemic fistula and because of polycythemia in pulmonary shunt.

R. F. A. = Right Femoral Artery R. F. V. = Right Femoral Vein

Figure 2.

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THE MONTH IN WASHINGTON

Editor's Note. The following summary of Washington news was prepared by the Washington office of the A.M.A. for distribution to state and regional medical journals.

A bill that is not a part of the official Eisenhower health program is causing a stir in Congress.

The bi-partisan measure would provide $90 million dollars to be spent over three years to help construct and equip non-federal medical research and laboratory facilities. Often in the past five years efforts have been made to get Congress to set up various huge new research programs pointed at one disease and calling for direct federal operation of the project. Without exception they have been turned down, Congress deciding that the existing National Institutes of Health are the proper vehicles for such all-federal research.

The bill that Congress now is interested in takes a different approach. It would have the federal government "get in and get out," a system used successfully in the Hill-Burton hospital construction program. Grants would go to nonprofit hospitals, medical schools, medical laboratories and like institutions, and the institution itself would have to match the federal money. Once the particular construction had been completed and equipped, the federal government would relinquish all control or influence over the project, as under Hill-Burton. Unlike the Hill-Burton plan, the grants would go directly from the U. S. to the project.

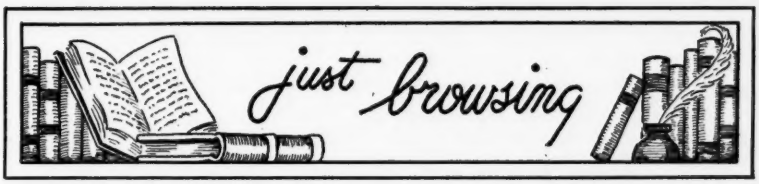
The Senate sponsors of this bill carry more than ordinary weight within their own parties. They are Senator Lister C. Hill (D., Ala.), who not only is chairman of the Labor and Public Welfare Committee but also heads the subcommittee that passes on most health appropriations, and Senator Styles Bridges (R., N.H.). The latter has added prestige as chairman of the Senate Republican Policy Committee. The House sponsor is Rep. Percy Priest (D., Tenn.), chairman of the Interstate and Foreign Commerce Committee, which like Senator Hill's committee is in charge of most health bills.

The reinsurance bill, again the center of controversy, is much the same as last year's bill, but singles out certain areas where the administration believes reinsurance would be particularly helpful. They are the coverage of rural families, greater protection for low-income families (including home and office calls), and the insurance of major medical costs. The new bill also makes some technical changes designed to assure that the federal government does not intend to regulate the insurance industry.

As introduced, the Defense Department's bill for more medical care for military dependents had no surprises at all. It is exactly the same bill offered last year. Efforts had been made to write in some compromises, but these were given up for the time being. The major question, as it has been from the start, is whether most dependents are to get their medical care from an insurance plan such as is proposed for other U. S. employees and their dependents, or are to be cared for by uniformed physicians in military hospitals.

A surprise Eisenhower request is that this country lift its statutory restriction on the amount of money U. S. may contribute toward the World Health Organization. Under present law the U. S. may not pay more than $3 million annually. The administration wants this ceiling lifted to $5 million.

Congress currently is deciding how much money to allow for health programs for the next fiscal year, starting July 1. Although the administration requested for Mrs. Hobby's department only about what it is spending this year ($2 billion), the budget for Public Health Service was upped about $77 million. Most of the research institutes are scheduled for substantial increases.



One of the great modern-day teachers of both scientific medicine and character building was Sir William Osler. Famous for his contributions to medical literature, he is also revered for the sound advice he gave his many students during his active years. In one of his famous addresses, "Aequanimitas," he described two characteristics which young physicians could profitably cultivate. These two important qualities—imperturbability and equanimity—cannot be described better than by quoting from the address as it was given to a graduating class in 1889.

"Imperturbability means coolness and presence of mind under all circumstances, calmness amid storm, clearness of judgment in moments of grave peril, immobility, impassiveness, or to use an old and expressive word, *phlegm*. It is the quality which is most appreciated by the laity though often misunderstood by them; and the physician who has the misfortune to be without it, who betrays indecision and worry, and who shows that he is flustered and flurried in ordinary emergencies, loses rapidly the confidence of his patients. . . . The first essential is to have your nerves well in hand. Even under the most serious circumstances the physician or surgeon who shows in his face the slightest alteration, expressive of anxiety or fear, has not his medullary centres under the highest control, and is liable to disaster at any moment. . . .

"In a true and perfect form, imperturbability is indissolubly associated with wide experience and an intimate knowledge of the varied aspects of disease. . . . From its very nature this precious quality is liable to be misinterpreted, and the general accusation of hardness, so often brought against the profession, has here the foundation. Now a certain measure of insensibility is not only an advantage, but a positive necessity in the exercise of a calm judgment, and in carrying out delicate operations. Keen sensibility is doubtless a virtue of high order, when it does not interfere with steadiness of hand or coolness of nerve; but for the practitioner in his working-day world, a callousness which thinks only of the good to be effected, and goes ahead regardless of smaller considerations, is the preferable quality.

". . . There is a mental equivalent to this bodily endowment, which is as important in our pilgrimage . . . a calm equanimity. . . . How difficult to attain, yet how necessary, in success as in failure. . . . One of the first essentials in securing a good-natured equanimity is not to expect too much of the people amongst whom you dwell . . . in matters medical the ordinary citizen of today has not one whit more sense than the old Romans . . . restrain your indignation when you . . . discover accidentally a case of Warner's Safe Cure in the bedroom of your best patient. It must needs be that offences of the kind come; expect them, and do not be vexed.

"It has been said that in prosperity our equanimity is chiefly exercised in enabling us to bear with composure the misfortunes of our neighbours. Now while nothing disturbs our mental placidity more sadly than straitened means . . . I would warn you against the trials of the day . . . of large and successful practice. Engrossed . . . in professional cares . . . you may find, too late, with hearts given away, that there is no place in your habit-stricken souls for those gentler influences which make life worth living.

". . . for some . . . there is in store disappointment. . . . Stand up bravely, even against the worst. . . . There is a struggle with defeat which some will have to bear, and it will be well for you in that day to have cultivated a cheerful equanimity. . . . Even with disaster ahead and ruin imminent, it is better to face them with a smile, and with the head erect, than to crouch at their approach. And if the fight is for principle and justice, even when failure seems certain, where many have failed before, cling to your ideal. . . .

"It has been said that 'in patience ye shall win your souls,' and what is this patience but an equanimity which enables you to rise superior to the trials of life?"—*O.R.C.*

PRESIDENT'S PAGE

DEAR DOCTOR:

This morning the officers of your Society, one of the delegates to the American Medical Association, and Mr. Ebel met with a Senate committee to discuss the osteopathic bill before the Senate.

We reiterated our stand as stated in the resolution passed by the House of Delegates and by documentary evidence were able, we feel, to refute many of the claims which had been made by supporters of this bill. I hope by the time you receive this letter evidence of our effectiveness will be apparent.

There are times I feel that as individual citizens our support and efforts should extend beyond the immediate field of medical practice and public health. I am thinking specifically of the Right to Work Bill now in committee which, in my estimation, will be another support in a strong secure democracy.

I feel that this bill is a strengthening of the Bill of Rights and provides protection against abuses that have been too evident in the immediate past.

I urge you all—your families—your friends to support this bill by adequately informing your legislators as to what you think. I have yet to meet the senator or representative who does not appreciate an honest opinion of your views. You should not deprive him of your support in such an important issue.

Yours very truly,

Murray C. Eddy, M.D.

EDITORIAL COMMENT

University of Kansas School of Medicine Issue

It is with pleasure and satisfaction that the Editorial Board presents this, the ninth annual University of Kansas School of Medicine issue of the JOURNAL. By so naming the issue, the Board hopes to express its deep appreciation for the support given the JOURNAL by the school all through the year.

In addition to numerous papers for the scientific section, the school regularly provides a series of Clinicopathological Conferences and Tumor Conferences in alternating issues of the JOURNAL. It also selects 15 theses from among those written by fourth year students at the school to provide a selection so that one may be published each month.

In other ways too physicians of the state are in debt to the medical school. Through postgraduate courses offered on the campus and circuit courses carried throughout the state, physicians have an opportunity to keep abreast of advances in medicine. Their attendance at such courses is adequate proof of the value of such a program.

We are fortunate in this state that a good relationship exists between the University of Kansas School of Medicine and The Kansas Medical Society. May we continue to work together in the future for the benefit of both organizations and the improved health of all in Kansas.

Simplified Insurance Forms

With an increasing percentage of patients having various types of health insurance, and with each insurance company having its own forms for submitting claims, the physician of today has had forced upon him the necessity of completing more and more forms which seem to be growing more and more complicated. Each company seems to vie with others in requesting detailed information, much of which the physician realizes is not at all pertinent to the case in question. However, he is cautioned to "fill in all spaces," often "as a courtesy to your patient."

The physician faced with this annoying problem will welcome the simplified form for submitting surgical claims which has been devised by a special committee of the American Medical Association. This has already received the approval of companies writing about 85 per cent of the group accident and health premium volume in the United States, and we hope will soon be in common use. Medical record librarians were able to obtain approval of a simplified but adequate "standard form" for such reports to insurance companies by hospitals, and it is gratifying to see that there is hope for simplification of surgical claims.

A vote of appreciation and confidence to the Committee on Prepayment Medical and Hospital Service.

Annual Meeting in Hutchinson

The enthusiasm of the Reno County Medical Society for its role as host to the 96th annual meeting of The Kansas Medical Society is clearly evident in the preparations that are being made to provide an outstanding program, an expanded list of scientific and technical exhibits, a series of entertaining social affairs, and a one-day schedule of sports events.

The dates, as reported earlier, are May 1 through May 5.

With the new Baker Hotel now receiving guests, Hutchinson can offer accommodations for all who attend the session. The air conditioned Hutchinson Arena affords ample space for general sessions, specialty society meetings, exhibits, and luncheons. The Prairie Dunes Golf Club and the Arkansas Valley Gun Club provide facilities for sports.

This year, for the first time, a morning has been set aside for meetings of various specialty societies. This will eliminate the conflict that has sometimes resulted in the past when specialty societies, in order to meet at all, were forced to plan scientific and business sessions at a time scheduled also for the general program, meetings of the House of Delegates, or social events.

Details of the program will be published in the April issue of the JOURNAL. For the present, in order to provide an opportunity for physicians to make plans for attending, the following chronological outline is presented:

Hotel Reservations

All hotel reservations for those attending the 96th annual session of The Kansas Medical Society are being made by the Chamber of Commerce, Hutchinson. All requests for reservations received by The Kansas Medical Society or by the Reno County Medical Society will be referred to the Hutchinson Chamber of Commerce, so those wishing to reserve accommodations will avoid delay by writing directly to the Chamber of Commerce office.

Sunday, May 1—Meeting of board of directors of Blue Shield; first session of annual meeting of Kansas Medical Assistants' Society.

Monday, May 2—Sports events and tournament banquet for all physicians; all-day session for members of the Kansas Academy of General Practice; final sessions for members of the Kansas Medical Assistants' Society.

Tuesday, May 3—General scientific sessions for members of The Kansas Medical Society during the morning; round table luncheon at noon; symposium, "How to Keep the Medical and Surgical Patient Alive," during the afternoon; dinner and evening meeting of the House of Delegates; beginning of annual meeting of Woman's Auxiliary to The Kansas Medical Society.

Wednesday, May 4—General sessions for all members of The Kansas Medical Society during the morning; round table luncheon at noon; symposium, "Functional Disorders," during the afternoon; annual banquet and evening entertainment; continuation of meeting of Woman's Auxiliary to The Kansas Medical Society.

Thursday, May 5—Scientific and business sessions of all specialty organizations; noon luncheon and second meeting of the House of Delegates.

Although in-state speakers will appear on a number of programs sponsored by specialty societies, speakers from outside the state, known throughout the country for their ability in the different fields of medicine, will present the general sessions and symposia. The list includes the following:

Frank F. Allbritten, Jr., M.D., Kansas City, Surgeon

Frederick R. Carriker, M.D., Denver, Ophthalmologist

Thomas Flint, Jr., M.D., Richmond, California, Internist

Edward C. Hughes, M.D., Syracuse, New York, Obstetrician and Gynecologist

John M. Lyon, M.D., Denver, Psychiatrist

Thomas E. Machella, M.D., Philadelphia, Internist

Walter S. Priest, M.D., Chicago, Internist

William E. Ricketts, M.D., Park Forest, Illinois, Internist

Philip Thorek, M.D., Chicago, Surgeon

Theodore E. Walsh, M.D., St. Louis, Otolaryngologist

For a great many years, Topeka and Wichita were the only cities in Kansas which offered accommodations for a meeting as large as the annual session of The Kansas Medical Society. Then, with the completion of the Town House Hotel, Kansas City was in position to serve as host. Now Hutchinson is added to the list of host cities.

The Reno County Medical Society, with only 46 members and with only limited help from outside, is arranging a meeting which promises to be one of the most interesting and most informative ever planned. Credit is due all who are participating, especially the following committee members:

Scientific Program: Doctors Victor R. Moorman, George E. Paine, Robert W. Fernie, Lorin E. Dickelmann, Edward L. Fitzgerald, Carlton H. Lee, DeMerle E. Eckart, John B. Jarrott, Robert Sohlberg, Jr., of McPherson, Francis A. Thorpe of Pratt, Orlin W. Longwood of Stafford, and Alfred S. Hawkey of Newton.

EENT Program: Doctors William M. Scales and Boyd L. Greever.

Commercial Exhibits: Doctors John N. Blank, Eldon S. Rich of Buhler, Louise F. Richmond, Gordon E. Stone, George E. Paine, and Victor R. Moorman.

Medical Assistants: Dr. George A. Chickering.

Golf and Skeet: Doctors Robert A. Crawford, Edward L. Fitzgerald, Gordon E. Stone, and Carlton H. Lee.

Arrangements on Housing: Doctors Edward L. Fitzgerald and Jack L. Perkins.

Arrangements on Meeting and Transportation: Doctors DeMerle E. Eckart, Harold R. Barnes, Sam Jones, Robert A. Crawford, and Edward A. Heffner.

Special Events: Doctors Robert N. Shears, Erling B. Struxness, and Guy R. Walker.

Entertainment: Doctors Charles A. Boyd, John J. Brownlee, Charles T. McCoy, Clarence W. Hall, Sam Jones, Boyd L. Greever, and Harry E. Blasdel.

Academy of General Practice: Doctors Chester W. Haines, Harold L. Graber, and J. Dale Burger.

Scientific Exhibits: Doctors Robert W. Fernie, E. B. Struxness, Charles DeHaan, John B. Jarrott, and DeMerle E. Eckart.

Auxiliary: Doctors Marion E. Nunemaker and J. Dale Burger.

New FCDA Personnel

Announcement has been made of the appointment of Dr. John M. Whitney as director of health services, Federal Civil Defense Administration, and the appointment of Dr. Paul A. Lindquist, a Kansan, as medical officer for Region VI which comprises five states with headquarters in Denver.

A graduate of the University of Kansas School of Medicine, Dr. Lindquist practiced in the state for several years before taking postgraduate work in public health. He has served as a health officer in several localities and recently returned from duty with the U. S. Public Health Service in Greece, Libya, and Germany.

Clinicopathological Conference

CASE PRESENTATION

Dr. Burkey, ENT resident: A 54-year-old Negro male was first seen in the outpatient department at KUMC on August 2, 1954. His chief complaints were dysphonia of eight months' duration and dyspnea for several weeks. The hoarseness seemed to follow an acute cold. Mirror examination of the larynx showed massive edema of the right true and false cords and of the right arytenoid. The right true cord was fixed while the left moved freely.

The patient was admitted to the KUMC hospital on August 8. Past history included gonorrhea at age 17 and removal of a tumor of the rectum at age 13. The tumor type was not determined.

On physical examination, the well developed well nourished Negro man was in moderate respiratory distress with marked dysphonia. Blood pressure was 140/80, pulse 74, temperature 98.2°F. Some suprasternal retraction was present. Laryngeal examination confirmed the findings previously established in the outpatient department.

Laboratory examinations resulted in the following: red blood corpuscles 4,100,000, hemoglobin 13.6 grams per 100 cc., white blood count 5,900 with a normal differential; the urine had 5 to 7 pus cells per high power field and occasional waxy, cylindroid and granular casts; urine test for bile was positive and fermentation slightly positive; VDRL was reactive with 256 Kolmer units and 64 Kahn units; nonprotein nitrogen 30.9, blood sugar 95 mgm. per 100 cc.; total protein of blood was 7.05 with serum globulin 2.4 and serum albumin 4.57. No acid-fast bacilli were found in the sputum.

During the hospital course of this patient, a tracheotomy was done on August 9. This immediately relieved the respiratory distress. Under local anesthetic, the larynx was visualized by direct laryngoscopy. The lesion appeared much as it had before except that it extended to the midline in the interarytenoid area. The left false cord was edematous.

Biopsy was done on the right arytenoid area, and the microscopic report was acute and chronic laryngitis. Four days later, esophagoscopy was done and no postcricoid tumor was seen. Direct laryngoscopy was repeated at the same time, and three more biopsies were taken from the right false cord. A consultant from the department of medicine predicted that the patient was a good surgical risk.

A wide field laryngectomy with right radical neck dissection was done August 25. The following morning, the dressings were found to be soaked with coffee colored liquid. It was assumed that the patient had regurgitated the tube feedings. They were discontinued and the patient was fed intravenously. Frequent tracheal suction was carried out with a return of the same brown fluid. The following day a small tube feeding was given with regurgitation. The patient seemed to be improved. That afternoon regurgitation occurred again, and it was necessary to return to intravenous feeding and gastric suction.

In spite of this, the patient's condition became worse. Temperature rose to 101.5°F. Because of an apparent waning in strength, tube feedings were started again August 26. Coarse rales were audible throughout both lung fields. The patient became unresponsive the following day. On August 28 the fever reached 104°F. Marked respiratory distress occurred. At 5:00 a.m. the blood pressure dropped to 90/0. It rose to 110/50 at 6:15 a.m., but the patient died at 6:25 a.m.

Question: What medication did the patient receive while in the hospital?

Dr. Burkey: Procaine penicillin in the dose of 1,200,000 units daily was given, changed to aqueous penicillin 600,000 units every three hours during the two days preceding death.

Question: Had there been a history of syphilis?

Dr. Burkey: It was not mentioned.

Question: Was there a history of gastric ulcer?

Dr. Burkey: No.

Question: How soon were tube feedings started postoperatively?

Dr. Burkey: There were no tube feedings the day of surgery. Tube feedings in small graduated doses began the next morning. The day following surgery, a total of 720 cc. was given before being stopped when regurgitation appeared. Tube feedings the following day totaled 90 cc. before being stopped. The next day, 1275 cc. were given. The following day only 60 cc. were given.

Question: Were any electrolyte studies made?

Dr. Burkey: No, only a nonprotein nitrogen.

Question: Was the patient ever treated for syphilis?

Dr. Burkey: We think not. If he was, the treatment was bismuth and arsenic.

Question: What was his occupation?

Dr. Burkey: A garbage man.

Question: How much did he smoke?

Dr. Burkey: A heavy smoker.

Question: Was the entire esophagus visualized?

Dr. Burkey: Yes.

From the University of Kansas Medical Center. Edited by Glen R. Shepherd, M.D., and Mahlon Delp, M.D., from recordings of the conference participated in by the departments of medicine, ENT, radiology, pathology and the junior and senior classes of medical students.

Question: Did he develop cough postoperatively?

Dr. Burkey: He undoubtedly coughed due to irritation of the trachea after surgery. I don't remember the amount of cough.

Question: Were there palpable nodes in the neck?

Dr. Burkey: No.

Question: Was there any history of tuberculosis?

Dr. Burkey: There was a family history of tuberculosis. The father died of "consumption."

Question: Were skin tests positive?

Dr. Burkey: Both tuberculosis and histoplasmin skin tests were positive.

Dr. Delp (chairman): Simpson, will you show us the electrocardiograms?

Albert P. Simpson (fourth year medical student): The electrocardiograms were normal except for ventricular premature contractions.

Dr. Dimond (professor of medicine): I concur. The auricular contractions continued normally through the ventricular premature contractions.

Dr. Delp: Wood, will you show us the x-rays?

Ralph H. Wood (fourth year medical student): These x-rays were taken the day the patient was seen in the outpatient department, August 3. The soft tissues of the chest do not appear abnormal. The heart is within normal limits. Costophrenic angles are clear. The right diaphragm is considerably elevated over the left. There is no Ghon complex. An opacity in the right apex could be an old healed tuberculous lesion. The trachea is in the midline. The chief findings in this chest film are the elevated right diaphragm and the old tuberculosis in the right apex.

A lateral chest film made the same day shows the aorta clearly outlined with just a possibility of aortic aneurysm. The right diaphragm elevation suggests either adhesions from an old pleurisy or paralysis from phrenic nerve involvement.

A chest film taken August 24, one day postoperatively and four days prior to death, shows essentially the same except there was then a bilateral infiltration of the lower lobes which I would interpret as bronchopneumonia. It appears fairly equal on both sides.

A flat plate of the abdomen was taken the following day. I can't see very much on it. I think the architecture of the pelvis is normal. I can't outline the kidneys or liver.

Chest films taken on August 25 again show elevation of the right diaphragm compared to the left. I don't think the liver is enlarged. There is no air under the diaphragm.

Dr. Delp: Dr. Youngstrom, do you have any comment?

Dr. Youngstrom (radiology): This case presents several possibilities. There was an increased density, particularly visible in the lateral film, in the right lung field anteriorly continuous with the liver shadow. This shadow is of considerable interest and needs to be explained. One would have to consider atelectasis in a segment of the lung, or a nodule of the liver pushing up and overlapping the heart and giving this type of shadow. If this were all liver, one would expect that the density here would not be demarcated as sharply as we find it. So we are forced to conclude there could very well be a segment of atelectasis in this area of the right lung.

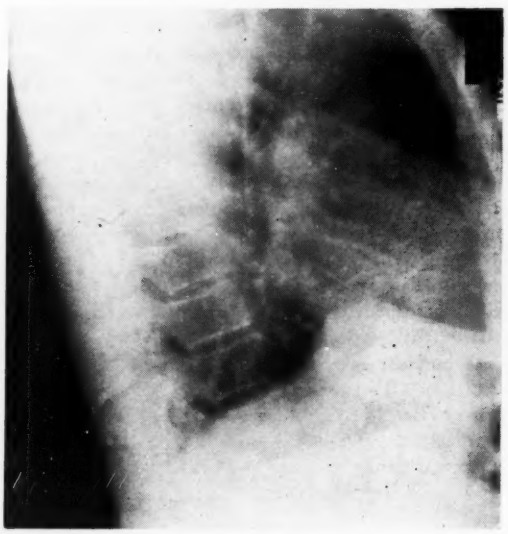


Figure 1. X-ray of chest, lateral view, showing unusual shadow continuous with liver shadow as well as high gas bubble in front of liver.

However, there is also a gas shadow here—it isn't clearly shown on the film—and this is pretty far forward, up above, and it's on the right when we compare with the other films. So that means there is gas apparently in the colon high in front of the liver. That does not usually occur except in cases of small livers or in cases of intestinal obstruction. It is called interposition of the colon segment above the liver. It usually comes way up under the diaphragm, and here we see it only anteriorly. The last anteroposterior film taken before death shows a bronchopneumonia.

Dr. Delp: This would seem to be a straightforward case in which the man was apparently healthy in many respects except for some symptoms of an isolated portion of his anatomy. He had hoarseness which had continued for a number of months. He came to the hospital. He had several biopsies made. He was operated upon and did quite well. Then something rather serious happened to the patient and he died. We are obligated to explain just what happened and why it happened. One controversial point which is not satisfactorily ex-

plained in the protocol is the serology with quite a high titer of Kolmer units. I expect that explanation on the part of those who are going to discuss it.

Mrs. Gruendel, will you begin the discussion?

DIFFERENTIAL DIAGNOSIS

Virginia Gruendel (fourth year medical student): Of particular significance in this case is an eight months' history of dysphonia. The most important physical finding it that of an edematous and fixed right vocal cord.

There are three major types of disorders which may produce dysphonia. These are: (1) intrinsic diseases of the larynx; (2) injury to or pressure on the recurrent laryngeal nerve; and (3) hysteria. In view of the fact that this patient did have positive physical findings, we need not consider hysteria as a basis for dysphonia here.

Now let us consider numerous disorders which may involve the recurrent laryngeal nerve and produce dysphonia. These include cardiac enlargement; aortic aneurysm; tumors, particularly carcinoma of the thyroid, carcinoma of the esophagus, superior sulcus tumor of the lung, or mediastinal tumors. The nerves also may be injured during a thyroidectomy. I believe we can rule out all these diseases since we do have direct visualization of a lesion on his right vocal cord. We also do not have any significant physical findings outside of the larynx which would make us consider any of these disorders very seriously.

Now let us consider the intrinsic diseases of the larynx which may produce dysphonia. These include acute inflammatory diseases such as acute catarrhal laryngitis, a diphtheritic laryngitis, or the acute edema which may follow aspiration of a foreign body. These are acute processes. They produce a generalized type of involvement of the larynx and rarely if ever produce fixation of the vocal cord. Therefore, I feel that they should not be considered seriously.

There are two types of chronic granulomatous lesions of the larynx which are difficult to distinguish from a neoplastic lesion. These are tuberculosis and syphilis. According to Cecil's *Textbook of Medicine*, tuberculosis of the larynx is almost always accompanied by active pulmonary disease. The acid-fast organism is readily isolated, and the patient usually has significant pulmonary findings. Also these patients usually complain of pain in the throat. I do not consider that tuberculosis could explain all of this patient's picture.

Syphilis of the larynx is also difficult to distinguish from a tuberculous or neoplastic lesion. About the only way we can make a positive diagnosis of syphilitic gumma is by tissue biopsy, or by watching the lesion disappear under intensive specific therapy. This patient did have a strongly positive serology. I think we cannot thoroughly eliminate syphilitic gummata upon the basis of the information in the protocol, but I consider such a diagnosis improbable.

There are several tumors of the larynx which may produce dysphonia. Of the benign tumors, the more common ones are polyps, papillomas, lipomas, or hemangiomas. Most benign lesions have a characteristic gross appearance, and the patient is usually cured by local excision.

Malignant tumors of the larynx may produce dysphonia. In any patient over 40, particularly males, who present with a complaint of dysphonia, one should seriously consider malignancy. Approximately 90 to 95 per cent of such lesions are of the squamous cell type. They usually arise in the anterior part of the vocal cord where the lymphatic drainage is rather sparse. They will produce only the symptom of dysphonia and will not metastasize early. They later extend to the posterior part of the cord and the surrounding tissues of the larynx, making the patient's prognosis much poorer. I think this patient had a malignancy of the larynx and that, from a statistical standpoint, it most likely was of the squamous cell type.

This patient was subjected to a wide field laryngectomy followed by a right radical neck dissection. During the first postoperative day his dressings were found to be soaked with a brownish liquid. This same coffee colored material was aspirated from the trachea. The patient later developed rales in the posterior lung fields, and his temperature rose steadily until the time he died.

I think the most logical conclusion one can draw is that the patient developed an aspiration pneumonia terminally. The most likely mechanism of aspiration could be by the production or development of a fistulous tract between the postoperative stump and the trachea. If the patient regurgitated only a small amount of gastric contents, the hydrochloric acid would readily break down a suture line and help the fistula formation. I think that is what happened in this patient. I think also that this patient probably had esophagitis from his repeated intubations.

In summary, I feel first that this patient had a malignancy of the larynx, and it most likely was squamous cell carcinoma; second, that this patient developed aspiration pneumonia; third, that he had an esophagitis and possibly he bled from an esophageal erosion or peptic ulceration. That's speculation.

Dr. Delp: Before you completely relax, I would like to know why you discarded the diagnosis of syphilis so quickly?

Mrs. Gruendel: The only way you could make a positive diagnosis is by tissue biopsy or watching the tissue response to antibiotic therapy.

Dr. Delp: I assume in this specific instance you took for granted that laryngectomy is not the com-

mon method of treating syphilis of the larynx. Is it possible this patient died of suffocation?

Medical student: No, I think in view of the regurgitation of coffee colored fluid and the x-rays showing terminal bronchopneumonia, the cause of death is explained.

Dr. Delp: You think he died of toxemia associated with bronchopneumonia.

Medical student: Yes.

Dr. Delp: We have noted here that this patient received a combination of penicillin and achromycin. Is that a proper combination of antibiotics for someone who had an infectious process such as Mrs. Gruendel suggested?

Medical student: I don't think I would have used it. I wouldn't say it was improper. I would have used a combination of penicillin and streptomycin.

Dr. Delp: Why would you do that?

Medical student: Some of the broad spectrum antibiotics are synergistic and some combinations are antagonistic. Penicillin and streptomycin are synergistic. I would have given streptomycin if I thought there was any possibility of aspiration pneumonia.

Dr. Delp: Dr. Proud, I am going to call on you after the pathologists have presented their material. Right now I'd like to ask Dr. Bolinger, who saw this patient and pronounced him a suitable individual for surgery, for his evaluation of this situation. You saw the patient early; you did not see him later. You knew nothing about any difficulties that arose later.

Dr. Robert Bolinger (medicine): Well, when we first saw this patient, as Mrs. Gruendel pointed out, we were faced with the problem of a high serologic titer, and we know it is difficult to differentiate luetic lesions from other types of lesions of the larynx. At that time we got a history of inadequate previous treatment, and I believe we recommended that the easiest way to differentiate this from the neoplastic lesion would be by a course of penicillin.

I assume that before surgery was carried out, lues was excluded in this patient. I did not see the patient during the postoperative period. Apparently it was featured mostly by persistent vomiting. If you want to start backwards and go forward, this persistent vomiting probably gave rise to the bronchopneumonia which he had. As to the cause of persistent vomiting following surgery, there are several possibilities. The most likely cause of that would be electrolyte imbalance of some type or another. Potassium deficiency or a low sodium syndrome often produces it.

I do not know whether bowel sounds were heard after surgery. Certainly bowel sounds should have been heard before the patient was allowed to have food by mouth. I suspect that they were not heard because such vomiting as this patient had, including a brown watery type of fluid, is frequently seen where there is some type of paralytic ileus.

We do not have available any abdominal studies on this patient, either before or after surgery. From the radiological standpoint, the suggestion that Dr. Youngstrom made, that the colon appeared distended in the chest x-ray film, probably should have received further investigation if it was reported then. There is no reason to think this patient had anything wrong with his abdomen before surgery. Barring unusual coincident lesions in the abdomen, I think this patient probably did not have primary abdominal disease and that he died of aspiration pneumonia.

PATHOLOGY REPORT

Dr. Kay Williams (pathology): The first biopsy specimen received from this patient revealed acute and chronic laryngitis, and the second specimen showed squamous cell carcinoma. The third surgical specimen consisted of the entire larynx and the internal structures of the right neck. Examination of the larynx revealed white granular tumor tissue which almost entirely replaced the right vocal cord and extended anteriorly across the midline for a distance of 3 or 4 mm. It extended superiorly to the aryepiglottic fold and inferiorly to invade the cricoid cartilage. No tumor was found in structures from the right neck.

At autopsy the pertinent gross findings were in the neck and chest. A U-shaped surgical incision was found on the anterior aspect of the neck, beneath which was a tracheostomy opening. Upon opening the incision, one looked directly down into the surgical wound upon the esophagus and pharynx. There was an opening measuring approximately 4 cm. in length and 2 cm. in width in the anterior wall of the pharynx at the point where it had been sutured at the time of surgery. The tissue surrounding the opening was extremely soft and necrotic. The esophagus revealed a markedly congested mucosa with some superficial ulceration. The trachea was sutured to the subcutaneous tissue and surrounding muscle and fascia. The tracheal and bronchial mucosae were extremely congested and edematous with some ulceration. The only other finding of importance in the neck was the left lobe of the thyroid, the capsule of which appeared necrotic.

In the chest, 100 cc. of serous fluid was found in the right pleural space. There were thin fibrous adhesions between the lobes of the lung on the right and between the right lung lobe and the diaphragm. The lungs weighed 2,700 grams, which is considerably heavier than normal. On section, a confluent bronchopneumonia was found. This was a rather homogeneous lesion that did not seem to be any

more severe in any one part of the lungs than in another. There was a calcified nodule in the right upper lobe, as was seen on x-ray.

The liver weighed 1,775 grams, which is perhaps a little heavier than usual in this size patient.

Dr. Jacob K. Frenkel (pathology): I don't suppose anyone was surprised by the gross findings. We will try hard to show you some interesting things later which were not suspected. Slides of the first biopsy taken on August 9 showed acute and chronic inflammation but no metaplasia or carcinoma. The second biopsy yielded tissue of the same nature as the main lesion found on surgical resection of the entire larynx. It was a squamous cell carcinoma arising from laryngeal epithelium which invaded the laryngeal wall (Figure 2). However, it appeared

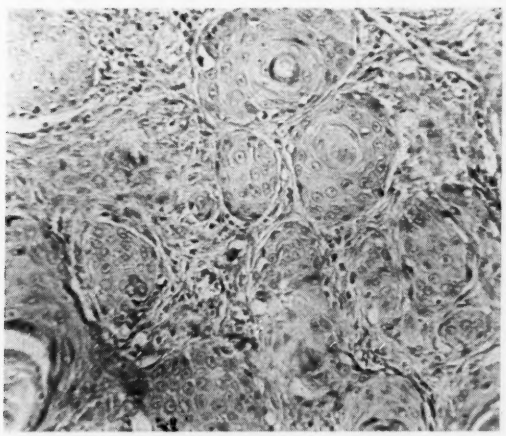


Figure 2. Squamous cell carcinoma of larynx. Magn. x210

as if confined to the larynx, and there is little likelihood that the phrenic nerve was involved.

The tenting of the diaphragm was on another basis. Other lesions in this area were as a result of resection with ulceration of the trachea and pharynx and development of the sinus tract. There were several ulcers in the esophagus. The thyroid gland showed necrosis of the acini where they bordered the sinus tract. The ultimate cause of death was bronchopneumonia.

Miscellaneous findings included a small splenic infarct, following an old thrombosis of the splenic artery which became recanalized. We observed some islets of Langerhans outside of the main acinar tissue of the pancreas. One got the impression that part of the exocrine portion of the pancreas had become obstructed, leading to pancreatic fibrosis with only isolated islands remaining. Some of the adrenal cortex was necrotic and replaced by fibrous tissue. In other areas there were regenerated nodules of adrenal cortical tissue. There did not appear to be a deficiency

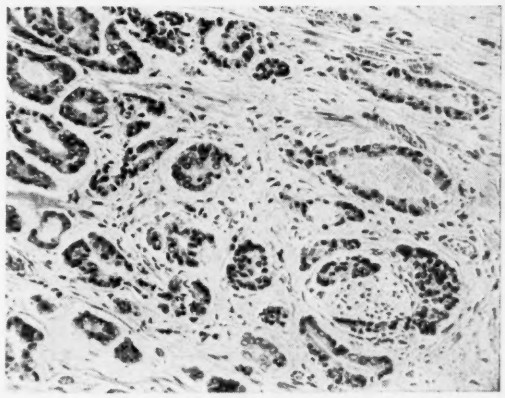


Figure 3. Occult adenocarcinoma of prostate gland with perineural invasion (lower right) x210

of adrenocortical cells. The kidney showed areas of inflammation and fibrosis resulting from destruction of the renal parenchyma due to arteriolonephrosclerosis.

Finally, we found another carcinoma, a carcinoma of the prostate gland. This is common in males of this age group (54). It was rather small and was not observed grossly at the time of autopsy. That this type of carcinoma can be invasive was shown by a small nerve that had been invaded by tumor (Figure 3).

It should be mentioned that in spite of the positive serological test for syphilis, there were no stigmata of syphilis in this subject. The aorta was in good shape. There were neither gummas nor lesions in the meningeal vessels. This, of course, is not uncommon since about 20 per cent of cases of syphilis leave no late lesions. On the other hand, we must consider that this man might have had syphilis of recent duration and that not enough time had elapsed for late lesions to develop.

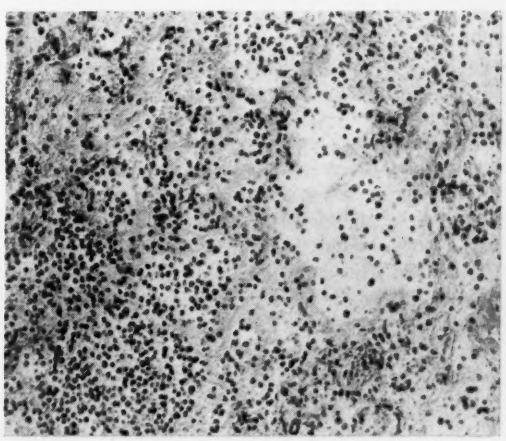


Figure 4. Bronchopneumonia x210

To sum it up, this man had a laryngectomy and tracheotomy. The tracheal stump was tied anteriorly to the deep neck muscles. As far as we know, it did not come directly to the skin. A fistula developed in the pharynx. There was regurgitation of gastric contents, some of which presumably went down this fistulous tract which ended close to the tracheal stump. There was probably aspiration. Bronchopneumonia developed (Figure 4). The organisms which were susceptible to penicillin and achromycin were suppressed, leaving *Pseudomonas, Staphylococcus aureus,* and *Aerobacter aerogenes* to multiply in the lungs. Bronchopneumonia due to these organisms resulted in pulmonary edema with suffocation.

CLINICAL DISCUSSION

Dr. Delp: Dr. Proud, we'd like to have some comments from you concerning first of all the risks involved in this type of surgery, and secondly, some comments about the treatment of carcinoma of the larynx.

Dr. G. O. Proud (professor of otorhinolaryngology): Obviously, this isn't the usual outcome of laryngectomy or we wouldn't do it very often. Some remarks concerning the usual course might be apropos. If the patient is feeling reasonably well at the time of surgery, he is allowed out of bed for a few minutes the following day, and the ambulation time is gradually increased on subsequent days back to full activity.

Intravenous and subcutaneous feedings are given for 24 hours, as a rule, with tube feedings started the day after surgery. The feeding tube is ordinarily removed on the 10th postoperative day, and it will be no surprise that fistula formation is extremely common. It occurs in approximately 50 per cent of cases.

Fortunately, however, most of the fistulae accommodate us by discharging into the neck instead of into the tracheal tube. On reinsertion of the feeding tube and pressure dressings, the fistula ordinarily closes spontaneously within a week. It does no good to attempt repair of the fistula at this time; the tissues are usually friable and difficult to work with.

The second complication of any frequency is pneumonia, which is usually of lobar type. It is unusual for a patient to develop aspiration pneumonia—this is the first I've seen. I would say approximately two or three per cent will get lobar pneumonia. The only other complication worthy of note is hematoma, which is rare and occurs in perhaps one per cent of the cases and will require a secondary opening of the closure.

As for management of carcinoma of the larynx, much is written today as to the advantages of x-ray therapy and surgical therapy. Obviously with lesions which are found early and involve only the central portion of one true cord, in which case they are known as intrinsic lesions, the incidence of long time arrest is extremely high either by surgery or by irradiating such a lesion. Various reporters will quote 70 to 90 per cent for 10-year arrest, depending upon the degree of euphoria of the reporter.

If the lesion extends to the anterior commissure or involves the arytenoid or becomes intrinsic in the epiglottis, surgical treatment is usually resorted to, although there are those who report glowing results with x-ray therapy.

There are good results from both x-ray and surgical therapy for cancer of the larynx. I think most radiologists will tell you that very high lesions, such as epilaryngeal lesions, and very low ones, such as epiglottic lesions, carry a gloomy prognosis by x-ray and are better treated by surgery. This was a rather high lesion and involved the false cords and the arytenoid.

Dr. Delp: Dr. Youngstrom, do you have any comments with regard to therapy?

Dr. Karl Youngstrom (radiologist): I think Dr. Proud has covered this satisfactorily, and we have no disagreement about the problem. We frequently get cases to treat with x-ray therapy, however, that the surgeons have refused, so you can finish the story from that angle. Radiologists seldom get the early cases because they are so amenable to surgery. There are a few places where experiments are being done with controlled studies comparing the effects of radiation and surgery on early lesions, by dividing cases between the two services. Maybe some day we'll have more accurate information from these studies. The main consideration usually is that the voice is preserved with x-ray therapy. However, they are both radical treatments, and when you treat cancer with x-ray, it's a radical treatment.

Dr. Delp: Do you think x-ray therapy really is free from serious complications in this group of patients?

Dr. Youngstrom: Well, I haven't had any fatalities from x-ray treatment, but there are complications and they sometimes require surgery. Edema of the glottis usually complicated with infection is common. Radiation interferes with defense mechanisms against infection. Tracheotomy frequently is necessary, although not always. There are many patients with carcinoma of the larynx who go through their whole course of radiation therapy without a tracheotomy.

Other complications are development of necrosis of cartilage in the region of the larynx, and there are two main causes for that. One is extension of the carcinoma there in the beginning and spread of infection under the influence of damage from x-ray. The other cause is excessive radiation which will result some years later in necrosis of the cartilage. That usually can be avoided by keeping radiation dosage down to 6000 r.

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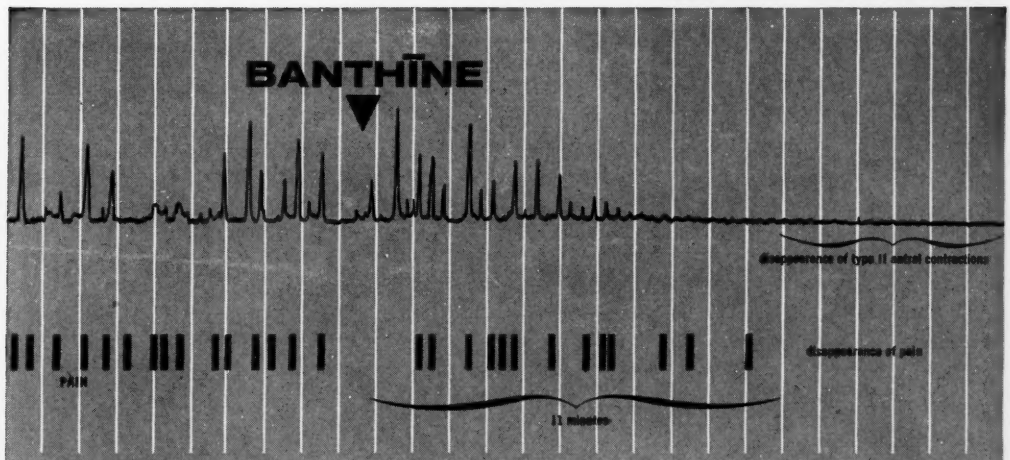

Effect of 100 mg. of Banthīne administered orally on antral gastric motility and duodenal ulcer pain.

Hightower, N. C., Jr., and Gambill, E. E.: Gastroenterology 23:244 (Feb.) 1953.

Hypermotility and Hyperacidity

A recent evaluation of anticholinergic therapy in peptic ulcer emphasizes the fact that now the profession has at its disposal agents that are "effective in reducing both secretory and motor activity of the stomach."

The effect on motor activity is generally more pronounced and less variable than on secretion; pain relief is usually prompt; a high degree of effectiveness is noted in ambulatory ulcer patients.

Ruffin, J. M.; Texter, E. C., Jr.; Carter, D. D., and Baylin, G. J.: J.A.M.A. 153:1159 (Nov. 28) 1953.

With its proved anticholinergic effectiveness, Banthine has been found extremely useful in the medical management of active peptic ulcer, whether duodenal, gastric or marginal.

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SEARLE

Dr. Dimond: Dr. Delp, I'd like to ask a simple question of Dr. Bolinger. Could this patient's difficulty have resulted in sufficient CO_2 retention to have contributed to his death?

Dr. Bolinger: That would have to be considered. However, I don't think the obstruction he had, at least when I saw him before surgery, was enough to give him increased intratracheal pressure. He didn't have much rib retraction and he had no vocal stridor at all. I'm sure he had anoxia later on, but it was probably from atelectasis of the lung from bronchopneumonia.

Dr. Delp: I think this is an interesting conjecture. One of the reasons I had that x-ray of the chest put back on the screen was that it seemed the patient had rather definite emphysema of the upper lobe which must have been something that developed as a result of the aspiration. Dr. Youngstrom wouldn't say anything about it, so I neglected to mention it. But I have a feeling that both the electrolyte balance and disturbance in oxygen uptake and carbon dioxide elimination must have accounted more than toxemia for this patient's death. I doubt that he died of toxemia from pneumonia.

ACTIVITIES OF MEMBERS

Governor Fred Hall has announced the appointment of the following as coroners for their respective counties: Dr. Niles M. Stout, Lyndon, Osage County; Dr. William K. Walker, Sedan, Chautauqua County; Dr. L. L. Huntley, Washington, Washington County, and Dr. Robert G. Wood, Coffeyville, Montgomery Country.

Dr. Neal M. Jenkins, Dr. Maurice Snyder, and Dr. Clarence J. Weber presented a study on "Unusual Complications of Myocardial Infarction" at a meeting of the staff of St. John's Hospital, Salina, last month.

The two hospitals in Hays, Hadley Memorial and St. Anthony's, announce that Dr. Joseph I. Mossberger is now in charge of pathological and clinical laboratories there. Dr. Mossberger, who is a diplomate of the American Board of Pathology, has been in private practice in Denver during the last five years.

Dr. Cora E. Dyck, who has been practicing at the Hertzler Clinic, Halstead, since early in World War II, has moved to Wichita to specialize in anesthesiology in association with Dr. Ray T. Parmley.

Dr. Mark A. Brawley, Frankfort, has been named health officer of Marshall Country.

Dr. Jack A. Haley, who has been practicing in Hanover, went to New Orleans last month to begin a residency in general and thoracic surgery under Dr. Alton Ochsner.

Dr. C. W Haines, who has been practicing in both Mount Hope and Haven, has announced the closing of his office in Mount Hope to devote his full time to Haven.

Dr. Donald L. Williams, Garden City, has been named health officer of Finney County for a period of one year.

Dr. Franklin D. Murphy, chancellor of the University of Kansas, presided over a symposium on internships at the 51st Annual Congress on Medical Education and Licensure in Chicago last month.

Dr. William W. Abrams, Kansas City, was guest speaker at a recent meeting of the Kansas City (Kansas) Women's Chamber of Commerce. His subject was "Medical Defense Against the Hydrogen Bomb."

Dr. Donald R. Davis completed a three-year fellowship in general surgery at the Mayo Clinic, Rochester, last month and returned to practice in Olathe. He has announced plans to establish an office in Mission when a new medical-dental building is completed there.

Dr. E. Grey Dimond, Dr. Antoni M. Diehl and Dr. Lee H. Leger, all of the University of Kansas Medical Center, participated in a community meeting at the medical school auditorium last month. The subject was "Know Your Heart."

Dr. Robert M. Brooker, Topeka, addressed the West Topeka Rotary Club on February 21 on the subject of "Recent Advances in Heart Surgery."

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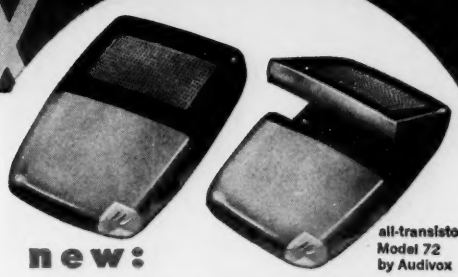

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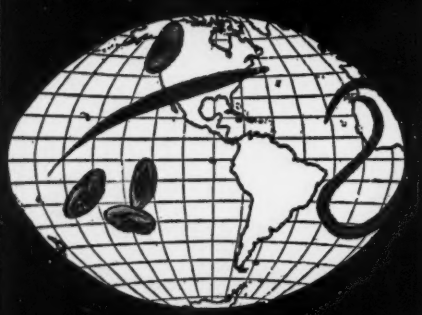

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COUNTY SOCIETIES

Dr. D. J. Lyons was elected president of the Crawford County Medical Society at a meeting held at Pittsburg in February. Dr. J. H. Bena was named vice-president, and Dr. G. W. Pogson was chosen as secretary.

Dr. Edith L. Potter, of the Department of Obstetrics and Gynecology, University of Chicago, was guest speaker at a meeting of the Sedgwick County Society held at Wichita on February 1. Her subject was "Erythroblastosis Fetalis." In the afternoon she conducted an informal clinic at Wesley Hospital with Dr. Edward X. Crowley as moderator.

Officers of the Northwest Kansas Medical Society were elected at a meeting held at Hoxie in February. Dr. E. Ernest Johnson, Jr., Norton, was named president, and Dr. Walter Stephenson, also of Norton, was elected secretary-treasurer.

A meeting of the Shawnee County Society was held at Topeka on February 7. Mr. Harold Schroeder, a tax attorney, spoke on "Taxes, Income, and Gift Estates." Mr. Oliver Ebel, executive secretary of The Kansas Medical Society, discussed bills introduced in the Kansas legislature, and Mr. Rueben M. Dalbec, executive assistant, spoke on social welfare problems.

Dr. Buford Hartman, Kensington, was elected president of the Smith County Society at a meeting held at the home of Dr. V. E. Watts, Smith Center, on January 25. Dr. Robert G. Sheppard, Smith Center, was elected vice-president, and Dr. Watts was named secretary. Dr. Hartman will serve as delegate to the state meeting with Dr. Sheppard as alternate.

Dr. C. D. Shrader, Newton, was speaker at a meeting of the Harvey County Society held on February 7. His subject was "Bandl's Contraction Ring," and he illustrated the subject with case reports.

In 1953, 8,600 pedestrians were killed in traffic accidents in the United States.

Tuberculosis mobile unit x-ray surveys in Kansas were made in 55 counties in 1953, and 125,124 Kansans were x-rayed.

Amendments to By-Laws

Two amendments to the By-Laws of The Kansas Medical Society have been proposed to the Committee on Constitution and Rules during the past year. They are published here for the information of all members of the Society.

1. By-Laws, Chapter VI, Section 1—Election of Officers. This section shall be amended in Lines 9, 10, and 11 to read as follows: "No past president may serve on more than two consecutive annual nominating committees, AND NO PAST PRESIDENT CURRENTLY HOLDING AN ELECTIVE OFFICE SHALL BE ELIGIBLE TO BE ELECTED TO THE COMMITTEE."

Comment: Criticism has been made that it is unfair to elect a past president holding an elective office to the Nominating Committee, which might feel free to place the same person in nomination for re-election.

The Committee on Constitution and Rules recommends the adoption of this amendment.

2. By-Laws, Chapter XI, Section 2—Committees. This section shall be amended in Line 6 after the word "Society" by the addition of the following: "Members of standing committees shall be appointed for terms of three (3) years, one-third of the committee membership to be appointed annually, EXCEPT that at the first year of the extended appointments, one-third shall be appointed for one (1) year, one-third for two (2) years, and one-third for three (3) years. In case of special committees, the same formula of appointments shall be used when desirable or necessary for the functions of the committee."

Comment: Under the present system it is recommended that a portion of each committee be reappointed, while under this amendment a majority of each committee will be retained. This should permit of no interruption in the course of work or problems begun or attempted. It also relieves each incoming president of the arduous problem of appointing entire committees, leaving to his discretion desirable members to be added. If adopted, this amendment will give the incoming president the important function of appointing some members for one year, others for two years, and others for full three-year terms.

The committee offers this for consideration of the House of Delegates. It may be voted upon or referred to the Council for consideration with recommendation for submission to vote next year.

Respectfully submitted,
A. W. Fegtly, M.D., *Chairman*

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Bumbalo, T. S., Gustina, F. J. and Oleksiak, R. E.
J. Pediat. 44:386, 1954.

White, R. H. R., and
[illegible]
Brit. M. J. 2:755, 1953.

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Brown, H. W.
J. Pediat. 45: 119, 1954

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Nominations for 1955-1956

A meeting of the Nominating Committee of The Kansas Medical Society was held at the Jayhawk Hotel, Topeka, on January 9, 1955, and the following names were proposed for the various offices to be filled by vote of the House of Delegates at the annual session in May:

FOR PRESIDENT-ELECT

Dr. Clyde W. Miller, Wichita

FOR FIRST VICE-PRESIDENT

Dr. Conrad M. Barnes, Seneca

FOR SECOND VICE-PRESIDENT

Dr. Thomas P. Butcher, Emporia
Dr. Mahlon H. Delp, Kansas City
Dr. Dwight Lawson, Topeka
Dr. Barrett A. Nelson, Manhattan
Dr. Lloyd W. Reynolds, Hays

FOR CONSTITUTIONAL SECRETARY

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FOR A.M.A. DELEGATE, 1956-1957

Dr. George F. Gsell, Wichita

FOR A.M.A. ALTERNATE, 1956-1957

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Dr. Glenn R. Peters, Kansas City
Dr. Frederick E. Wrightman, Sabetha

The list of nominees is presented now in accordance with provisions of the Constitution and By-Laws. Additional nominations, of course, may be made from the floor at the time of the election.

TPI Test Available to Kansas Physicians

The Treponema Pallidum Immobilization test, a specific diagnostic test for syphilis, is now available to Kansas physicians through an arrangement made by the Kansas State Board of Health. The test is not intended as a routine diagnostic procedure; its value lies in its accuracy and specificity when applied to doubtful cases.

Blood specimens should be submitted to the Public Health Laboratories, which will process the sample and send it to the Venereal Disease Research Laboratory of the Public Health Service, in Georgia, where the test will be run. The request to the Kansas State Board of Health for this service should include a brief review of the diagnostic measures so far performed on the patient in question.

The service is being offered now for a trial period only. The Public Health Service, on July 1, 1955, will review its decision and decide whether or not to continue the service.

The Chamber of Commerce, Hutchinson, will make hotel reservations for those attending the annual meeting of The Kansas Medical Society, May 1-5.

DEATH NOTICES

Pearl R. Young, M.D.

Dr. P. R. Young, 78, an active member of the Franklin County Society, suffered a heart attack on the street in Ottawa on January 24 and died immediately. He had practiced in Ottawa, specializing in eye, ear, nose, and throat work, since 1926, except for a period of three years when he lived in Topeka and Axtell. He was educated at the University Medical College of Kansas City, receiving his degree in 1905. He began practice in Axtell, later moved to Solomon for a ten-year period, and practiced also in Salina for five years before opening his office in Ottawa.

William Herbert Walker, M.D.

An honorary member of the Wyandotte County Society, Dr. W. H. Walker, 80, died at his home in Robards, Kentucky, on February 9. He had been in retirement since 1943. After his graduation from Louisville Medical College in 1897, Dr. Walker began practice in Kansas City, continuing there for 38 years.

Edgar Ernest Brooks, M.D.

Dr. E. E. Brooks, 71, who had practiced in Burden since his graduation from the University Medical College, Kansas City, in 1908, died at an Arkansas City hospital on February 21. He was a member of the Cowley County Medical Society. Dr. Brooks was active in civic affairs, having served 18 years as mayor of Burden and 11 years on the school board there. He was honored by his community on June 24, 1951, at a celebration called "Dr. Brooks' Day."

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Epidemiology of Infectious Hepatitis

Monaford D. Durnell, M.D.

Kansas City, Missouri

Outbreaks of infectious (epidemic) hepatitis have been recognized for at least 200 years in Germany. Many accounts have been written, apparently about this disease, referring to it by such terms as "infective hepatitis," "epidemic catarrhal jaundice," "epidemic hepatitis," and "hepatitis epidemica." More recently, the epidemiology of this disease has been more thoroughly studied. It has been reported to have been "the only pandemic disease of World War II."[1] Until recently, the majority of the larger epidemiological studies had been made on military personnel, and accurate data on civilian epidemics were scarce. This was due in part to the lack of a specific diagnostic test and to general laxness in reporting the disease, especially mild clinical cases.

GEOGRAPHICAL DISTRIBUTION

The distribution of infectious hepatitis is not exactly defined, but there does not appear to be climatic or environmental limitation as this disease occurs throughout the world. It is universally agreed that it flourishes best under poor sanitary conditions.[2, 3] Infectious hepatitis has been endemic in Kansas during recent years, and small epidemics have occurred in several communities. Factors often reported in outbreaks of this disease include a damp climate and wet surroundings.[4] However, these factors are not essential for widespread epidemics have been reported in deserts.

SEASON

Many workers[2, 5, 6, 7, 8, 9, 10] in nearly all parts of the world report epidemics occurring in the fall and winter months while others report epidemics occurring during the summer months. The characteristic trend of epidemics appears to be increased incidence during fall and early winter. No truly adequate explanation for this seasonal trend has ever been put forward. The best hypothesis is that it may result from the crowding which takes place at the onset of cold weather with the idea that close personal contact in the presence of poor sanitary conditions may account for higher incidence.

INCIDENCE

Apparent sporadic cases are encountered frequently. In numerous epidemics there are surely many uncounted subclinical cases.[11] Clinical incidence in the Baltimore civilian population over a one-year period was 2.9 per cent[12] and that in an institution among student nurses was 18 per cent.[13] Incidence among occupational troops in Europe has been 0.6 to 1.8 per cent per annum.[14] In an epidemic in a summer camp where more intimate interpersonal contacts were made between those of a younger age group, the incidence was 61 per cent over a 13-week period. In a civilian epidemic, 17 per cent of households had multiple cases.[15]

Many recent workers,[2, 10, 16] in studying family outbreaks of infectious hepatitis, found the exposure of children within family groups results in a surprisingly high incidence of the disease. The straggling succession of cases spaced at irregular intervals is quite frequent in family studies. The terms "serial incidence" and "kangaroo sequence"[17] have been used to describe this prolongation of incidence.

An illustration of the high incidence of this disease among members of larger families was seen in a recent case treated at the University of Kansas Medical Center. The patient, a young mother of five children, lived in a community in Kansas where scattered cases of infectious hepatitis had occurred for four to five months prior to the onset of the disease in this family. The seven-year-old daughter, who attended a consolidated school where a cook had had infectious hepatitis, became ill the first week of May. Four days later two sons, ages six and four and one-half years, also developed the illness. During the third week of June the patient, her husband, and the 14-months-old daughter developed typical symptoms. All but the three youngest children developed jaundice. The morbidity was much greater in the husband and especially in the patient who was hospitalized during her third recurrence of the disease.

Race and Sex—Since a large percentage of reported cases are in military personnel, the majority of cases in the literature are males. However, in epidemics where both males and females are exposed, the difference of sex incidence is not significant. In the Mediterranean Theater of World War II, Negro troops appeared to be more resistant to infectious hepatitis than white troops.[18]

Age—The age of greatest incidence, in those epidemics in which all age groups are exposed,

This is one of 11 theses, written by fourth year students at the University of Kansas School of Medicine, selected for publication by the Editorial Board from a group judged to be the best by the faculty at the school. Dr. Durnell is now interning at General Hospital, Kansas City, Missouri.

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ranges from 5 to 17 years[7] or 6 to 25 years.[11] Ford[19] reports an epidemic of 300 cases in London in which 80 per cent of the patients were under 15 years and 90 per cent were under 24 years of age. In the Mediterranean Theater during a 27-month period in 1943-45, in which more than 35,000 cases of infectious hepatitis occurred in military personnel, there were twice as many patients under the age of 30 as there were over 33.[18] In the epidemic on Malta[5] during World War II, 86 per cent of the cases fell in the age group 20 to 29.

MORBIDITY AND MORTALITY

In general, severity is reciprocally related to age.[20] Especially is this true in the youngest age groups (0 to 4 years); it therefore appears that it is best to have experience with the virus at an early age. The low morbidity in children would lead one to believe that infectious hepatitis is a relatively innocuous disease. However, in persons of military age it is a disease of high morbidity. The period of disability in the Mediterranean Theater averaged approximately 60 days,[11] and the mortality was approximately 0.2 per cent. Mortality may vary with the general condition of the patient before onset[43] and with the difference in the virulence of various strains of the virus. In general, the mortality rate of epidemics is less than 1 per cent.

INCUBATION PERIOD

Civilian and military epidemic studies and the human fecal-oral and parenteral transmission experiments within the past 15 years have contributed much information. The incubation period given by various workers[1, 7, 19, 20, 21, 22, 25] ranges from 8 to 42 days, but the majority have found it to range from 20 to 40 days. In experimentally induced infections, the incubation period was prolonged several days by attenuation of the causative agent or by decreasing the number of viral bodies given.[20]

PERIOD OF INFECTIVITY

During World War II, in the military epidemic on Malta, it was first thought by some workers[5] that infectivity was confined to the pre-icteric stage. In more recent years, experimental fecal-oral and parenteral transmission of the causative agent has revealed that the virus is present in blood three days before appearance of symptoms and is present at least eight days after onset of jaundice.[21] Fecal material has been proven to be infectious during the first two weeks of jaundice, but isolated voluntarily-induced cases may remain infectious for five to 15 months or longer as "chronic-active carrier cases."[21] However, the majority of the human volunteer experiments have shown the causative agent not to be present in the volunteer's feces three weeks after disappearance of jaundice.

IMMUNITY

Experiments with human volunteers indicate that an attack of infectious hepatitis "provides immunity against a similar strain of virus"[7] which is believed to be "relatively permanent."[11] The question of whether or not the immunity resulting from a single attack is effective against multiple strains has not been definitely proven.

There is considerable evidence to support the belief that resistance of persons over 30 years of age is due at least in part to acquired immunity obtained by subclinical infections.[5, 11, 18] A postulation that decreased relative incidence of the disease with advancing age might be due partially to some unknown physiological factor related to age has been offered.

No cross immunity for homologous serum hepatitis has ever been demonstrated.

METHODS OF TRANSMISSION

The causative agent of epidemic hepatitis is transmitted in a variety of ways, and this contributes to the complexity of the epidemiology of the disease. Contact infection is presumably the most frequent type of transmission with both droplet and finger transmission as likely mechanisms.

Epidemics, studied thoroughly as to their epidemiology, have been described as being transmitted by contaminated milk,[26, 30] water,[1, 8, 13] and food.[29] The onset of these was explosive in character. Droplet or direct fecal-oral transmission[11, 12, 13, 18, 24, 27] produces epidemics that are not so explosive in onset but with cases more scattered. The portal of entry of the causative virus is thought to be the mucosa of the intestinal tract.[18, 28] Evidence for air-borne transmission is not convincing in most epidemics.

The purification of water containing the causative agent by increasing the chlorine content has not been practical. Chlorine content must be raised to 15 parts per million for a 30-minute contact period to get a definite attenuation of the hepatitis agent.[31] Boiling water appears to be more effective in controlling spread of the disease.[8]

ETIOLOGICAL AGENT

The causative agent is primarily hepatotrophic, filtrable through a Seitz and Berkefeld filter,[44] and it gives epidemiological evidence of being a virus. The virus is a sturdy organism as it is not killed by heating to 56°C. for 30 to 60 minutes and will withstand several months of drying. It remains active

ELECTRON PHOTOMICROGRAPH

Diplococcus pneumoniae 44,000 X

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for several years in frozen material and survives for months in 1:2000 merthiolate and equal parts of phenol and ether 0.5 per cent.[32]

The virus is present in the blood and feces[21, 30] of patients during the clinical stages of the disease. There is some disagreement among workers as to whether the virus exists in urine during the acute stages of the disease. Findlay[33] reported it to be present in urine but Neefe[1, 34] and Capps[21] were unable to isolate it from urine on repeated attempts. Experimental work to isolate it from nasopharyngeal washings have failed.

Until recently, no host other than the human[38] had been found and attempts to infect several common laboratory animals have failed.[11, 27, 36] These two factors have greatly hindered progress in control of the disease.

Recent experimentation[35] has revealed that an agent which is capable of inducing mild hepatitis in human volunteers has been propagated in rabbit liver tissue culture and in the amniotic cavity of the chick embryo. Whether this agent is identical with that causing infectious hepatitis cannot be stated with absolute certainty because of the lack of development of specific serological tests. However, the clinical picture is indistinguishable from non-icteric hepatitis following injection with natural infectious hepatitis virus. One may postulate further that serial transmission through tissue culture causes attenuation of the causative agent to the point that icterus is not produced.

A skin test has been developed recently which is positive in all convalescents of infectious hepatitis regardless of whether they developed the disease spontaneously or after experimental exposure.[35] Personal communication on May 10, 1954, with Dr. Mahlon Delp, professor of medicine, University of Kansas School of Medicine, revealed "at first the skin test was received with great enthusiasm but at the present time its value is questionable."

New methods of propagation of the virus open different avenues of approach to the diagnosis and control of the disease such as the development of specific complement fixation and hemagglutinin tests for the serologic determination of the presence of the causative virus. Eventually they should lead to the preparation of a specific vaccine for the prevention of infectious hepatitis.

Preventive Measures—Control of an infectious disease in which the etiological agent cannot be identified in the laboratory, and in which the characteristic clinical feature appears in only a portion of the cases, presents a difficult problem.

General Measures—Personal cleanliness, proper disposal of excreta, and prevention of overcrowding and contamination of food, water, and milk supplies[42] all aid in control of the disease.

Since healthy carriers have been proved to exist and since patients may be infectious several days before onset of symptoms and at least three weeks after disappearance of symptoms, the problem of isolation of known cases during the period of infectivity and quarantine of known contacts becomes such an immense problem that it borders on the impossible. Especially is this true since the majority of patients are of school age. In thinking along the lines of the efficacy of isolation and quarantine, one must remember that for each clinical case there are probably many subclinical cases that are potentially infective.

Specific Measures—Use of Gamma Globulin. Early in the 1940's, it was postulated that neutralizing antibodies in gamma globulin obtained from pooled human blood plasma might be effective in aborting or attenuating this disease if administered during the incubation or pre-icteric stage. In 1945, Stokes and Neefe[37] first demonstrated the value of gamma globulin in the prevention or modification of infectious hepatitis in a group of persons exposed in a severe outbreak. The relatively long incubation period (20-40 days) of this disease and the delayed onset of the icteric stage are time factors which facilitate the use of gamma globulin for this purpose. Results are good when gamma globulin is administered intramuscularly to exposed individuals during the incubation period of the disease. Results are best when injections are given at least six days prior to the appearance of jaundice. Capps and Stokes[21] dem-

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onstrated this by giving a large dosage (0.06 cc. per pound of body weight) of gamma globulin and found that it failed to prevent the onset of jaundice four days later.

Due to the limited supply of gamma globulin and its great demand in poliomyelitis experimentation, much work has been done in an attempt to determine the minimal effective dosage for the prevention of this disease. Earlier experimentation[16, 39, 41] found the proper dosage of gamma globulin to be between 0.01 and 0.06 cc. per pound of body weight. The dose of 0.1 cc. was too high. Some found that 0.01 cc. per pound failed to prevent the disease in a few scattered cases, but it does appear to be effective in preventing the spread of hepatitis in epidemics among children and within family groups.[22, 44] Havens,[39] using 0.08 cc. per pound of body weight, showed no better results than Ashley,[10] who used only 0.01 cc. per pound. He found it to be quite effective in reducing incidence of secondary cases among family contacts.

The family attack rate in families receiving no inoculation was 15.2 per cent while that in families receiving one inoculation was 0.6 per cent. The smaller single injection of 0.01 cc. per pound of body weight gives protection for 2 to 9 months.[22] It is conceivable, but not probable, that traces of gamma globulin remain in the circulation or attached to tissue cells for that length of time. The greater probability exists that the waning passive immunity offers the opportunity for unapparent or subclinical infections among inoculated groups, which results in active immunization superimposed on passive immunity.

Today the use of gamma globulin in epidemics appears to be the most helpful tool in the prevention of spread of infectious hepatitis.

CONCLUSIONS

1. Review of the epidemiological characteristics of infectious or epidemic hepatitis has been presented.
2. Use of gamma globulin, good personal hygiene, and environmental sanitation are avenues of control and prevention that can be followed.
3. Future experimentation may produce a specific laboratory diagnostic test or a satisfactory vaccine which possibly would give adequate control and prevention of infectious hepatitis.

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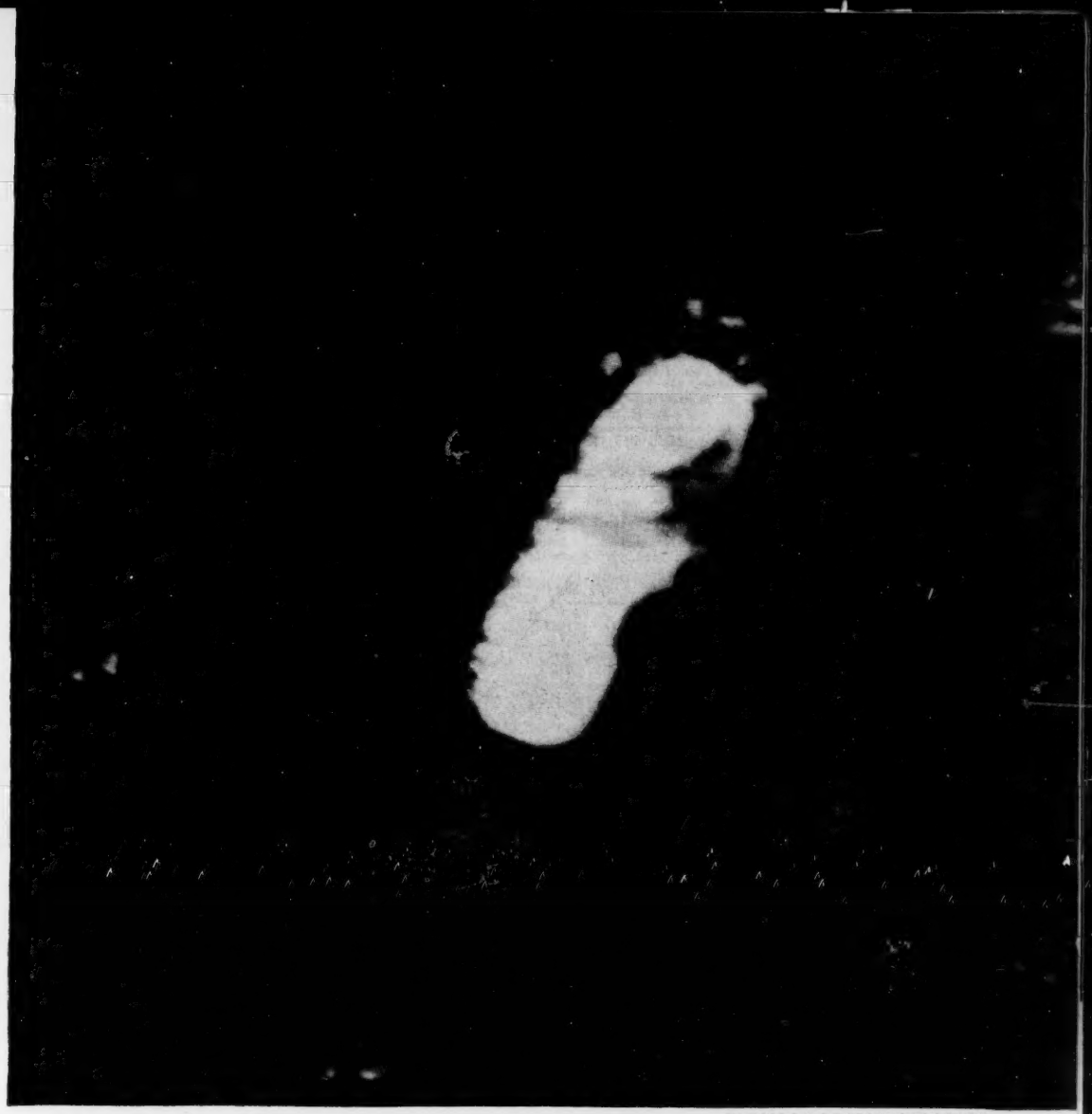

ELECTRON PHOTOMICROGRAPH

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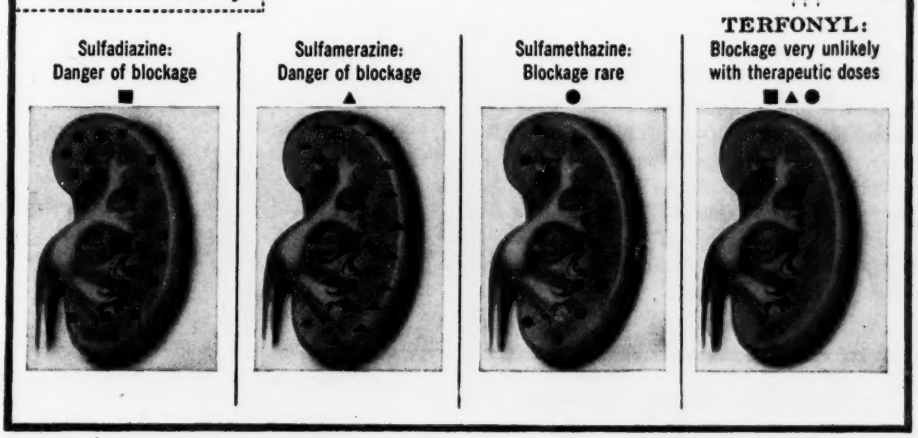

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New Department of A.M.A.

A new department known as the Membership-Circulation Department of the A.M.A. was set up in January to keep all records and operations concerned with membership status. Robert A. Enlow will head the new unit. Frank V. Cargill, who formerly directed the keeping of such records, will devote his time exclusively to the A.M.A. Directory and Biographical Departments.

Society of Physician Pilots

Plans are now being made for the organization of a national society of physician pilots, and immediate objectives are listed in a publicity release as compilation of a complete roster of flying physicians, appointment of temporary local area chairmen, the collection of ideas and suggestions, and encouragement to physicians to fly to the A.M.A. meeting in Atlantic City, June 6-10. A program will be arranged there if enough interest is shown.

The purposes of the society are tentatively listed as scientific, educational, and social, with emphasis on education to promote greater aviation safety.

Physician pilots are asked to send to H. D. Vickers, M.D., 25 Jackson Street, Little Falls, New York, their names, type of plane flown, and landing field.

Information on the preparation of physicians' income tax forms is being presented in the January and February issues of the *Journal of the American Medical Association*. The articles will later be published in handbook form, available from the Law Department of the A.M.A.

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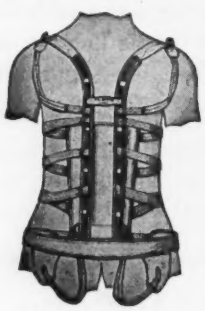

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BOOK REVIEWS

Pediatric Diagnosis. By Morris Green and Julius B. Richmond. Published by W. B. Saunders Company, Philadelphia. 436 pages, 8 illustrations. Price $10.

This book considers pediatric diagnosis in three parts: history taking, physical examination, and symptom diagnosis. A fourth part entitled "Health Supervision" concludes the text. Though valuable in itself, this last section relates poorly to the plan and context of the rest of the book.

The section on physical examination, comprising about half the entire text, is remarkably detailed and complete. Many useful pointers on the handling of children in the examination situation are included for the beginning doctor. On the other hand, the discussion of abnormal physical findings frequently presumes a knowledge of pediatric pathology and even clinical pediatrics which the beginning doctor might not be expected to possess.

The section on symptom diagnosis seems inexpertly handled. In an apparent fear of overlooking some disease entity which, under extreme conditions, might be responsible for the symptom at hand, the authors have indulged in what might be termed disease name dropping—the listing of many diseases without sufficient discussion or qualification. For example, on less than three pages there are listed 44 possible causes of stridor. This section reads more like the index of a book than the text of one.

Laboratory aids to diagnosis are almost completely ignored. This would seem to be a serious deficiency in a book concerned with "a systematic and integrated approach to patient study." Herein lies the book's greatest defect, and it is largely one of design rather than execution. Any attempt to fragment the physical findings and symptoms of a patient, and to categorize the possible causes of each fragment, would seem to be a less helpful approach to medical practice than a more complete and integrated study of children and their maladies. Methods of study may be largely a matter of personal preference, and for those who favor a highly systematized use of check lists, this book should be entirely adequate.

The index is well done. The bibliography is pertinent and, with a few exceptions, well chosen and up-to-date. The technique of citing references within the text where they pertain to the discussion has many advantages over the conventional use of lists at the ends of chapters.—*C.A.M.*

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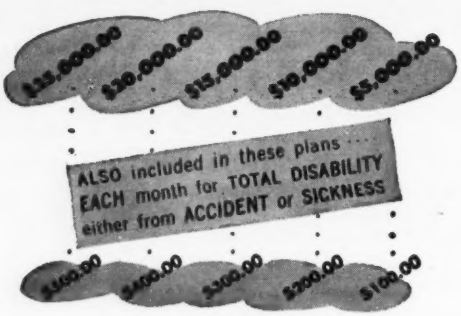

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ANNOUNCEMENTS

Any physician interested in gastroenterology will be welcomed at a meeting of the Southern Region of the American College of Gastroenterology to be held in Memphis, Tennessee, on Sunday, April 24. Programs may be obtained from the Secretary, 33 West 60th Street, New York 23, New York.

The 1955 meeting of the American Goiter Association will be held in the Skirvin Hotel, Oklahoma City, April 28, 29, and 30. The program will consist of papers and discussions on the physiology and diseases of the thyroid gland. Dr. John C. McClintock, 149½ Washington Avenue, Albany, New York, is secretary.

The Thompson, Brumm and Knepper Clinic, St. Joseph, Missouri, announces that the sixth annual Dr. F. G. Thompson, Sr. lecture will be presented at the clinic building on Thursday, May 19, at 8:15 p.m. Dr. Walter V. MacKenzie, professor of surgery at the University of Alberta, Edmonton, Canada, will present a lecture on "Pancreatitis, Fundamental and Clinical Aspects." All physicians are invited to attend.

The 41st session of the Trudeau School of Tuberculosis will be held at the school, Trudeau, New York, June 1 through June 29. The course will cover all aspects of pulmonary tuberculosis and certain phases of other chronic chest diseases. A tuition fee of $100 will be charged. Applications may be secured from the secretary of the school.

The Department of Otolaryngology, University of Illinois College of Medicine, will hold its annual assembly in otolaryngology, September 19 through October 1. Dr. Maurice F. Snitman will direct Part I, ending September 24, on surgical anatomy of the head and neck, fundamental principles of neck surgery, and histopathology of the ear, nose, and throat. Dr. Amanuel M. Skolnik will conduct Part II, devoted entirely to lectures and panel discussions of advancements in otolaryngology. Registration is optional for one or both weeks.

X-ray findings of the Kansas mobile units during 1953 were as follows: 379 suggestive of tuberculosis; 1,456 suspected of tuberculosis; 1,975 showing cardiac pathology, and 237 showing other non-tuberculous pathology.

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A.M.E.F. Receives $10,355

A contribution of $10,355 to the American Medical Education Foundation was made last month by the Utah State Medical Society. In presenting the check Dr. George M. Fister, Ogden, Utah, said, "It is the belief of all of us who practice medicine in Utah that every physician in America should support the Foundation's program to lend financial assistance to our medical schools. We hope that our adoption of a $20 per member dues increase will help show other states that the urgent need for funds demands bold action on the part of every state medical society."

Expansion of Public Health Service

A major expansion and reorganization of the commissioned reserve of the Public Health Service, Department of Health, Education, and Welfare, as a national defense measure has been announced by Surgeon General Leonard A. Scheele. The service expects to commission an additional 2,000 reserve officers by June 30, 1955, and present plans call for commissioning another 3,000 officers during the 1955-1956 fiscal year.

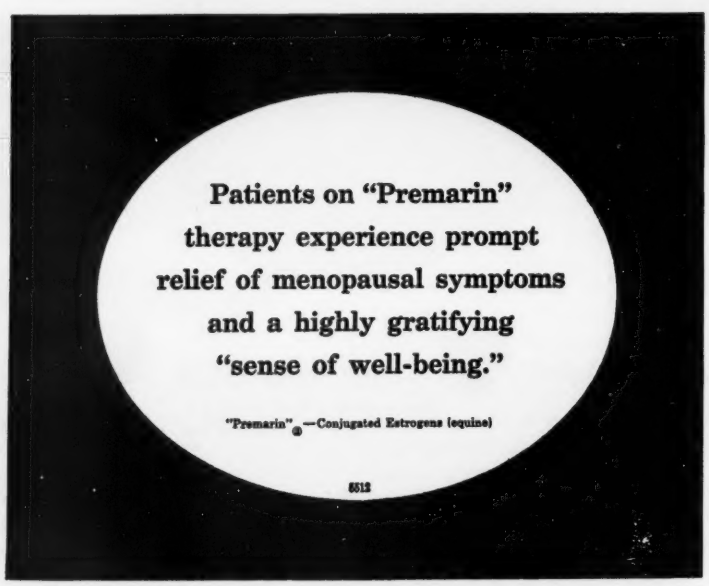
The service has been assigned extensive new defense responsibilities. In addition to building up emergency reserve strength, it is stepping up research in disaster health problems and is developing a program to reinforce state and local health departments in time of national crisis.

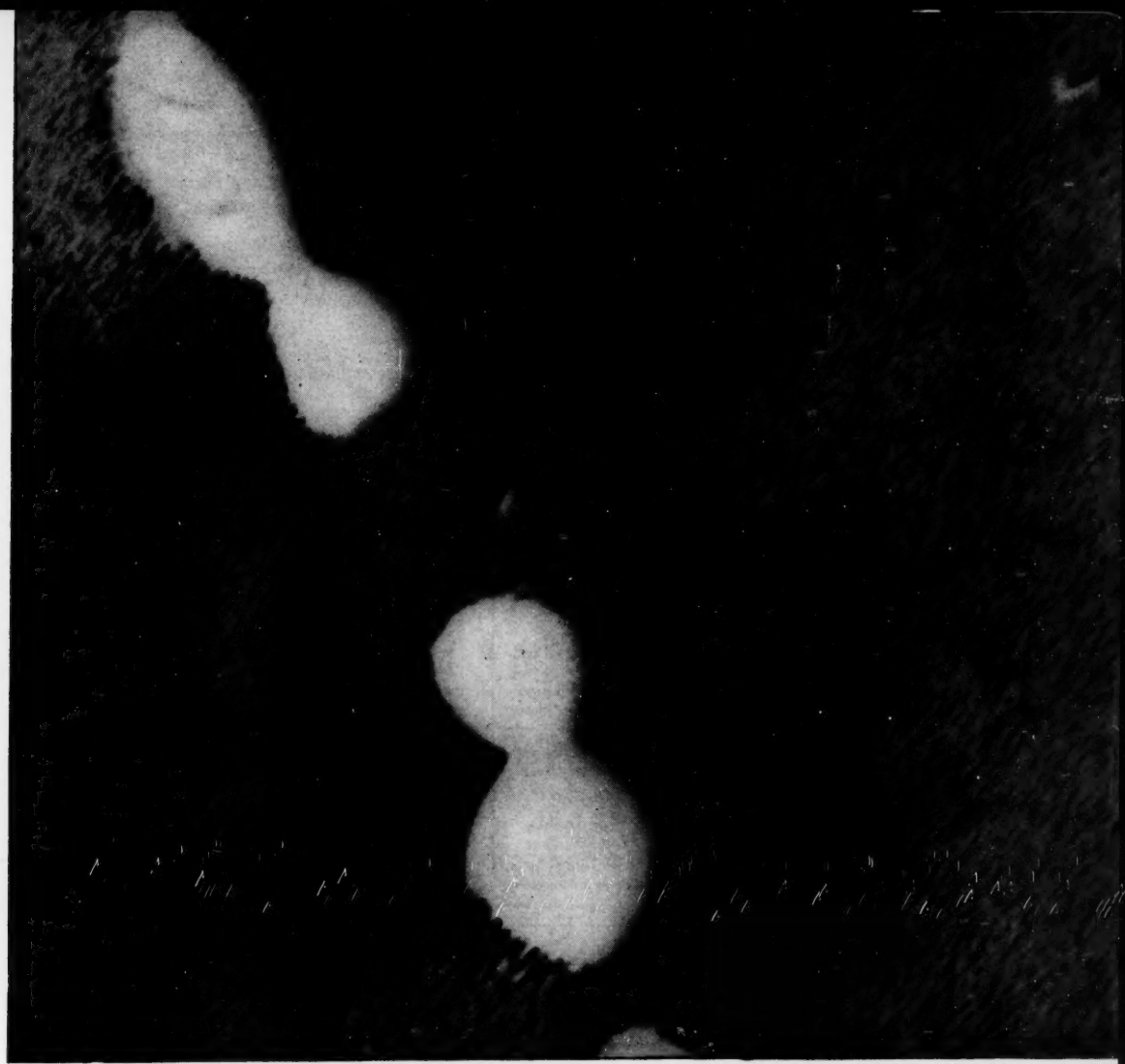
Dr. Scheele said that an officer of the emergency reserve would be called to active duty without his consent only in the event of a national emergency, publicly recognized as requiring such action. Officers of the emergency reserve already performing important health functions would not be called for service in another area without clear justification.

The emphasis initially will be on commissioning physicians, dentists, sanitary engineers, and nurses. A training program for officers in the emergency reserve will start soon and will consider health problems associated with atomic, biological, and chemical warfare and other national emergencies.

Medical Films Popular

The popularity of medical films may be gauged by a study of registration at the film program given at the A.M.A. meeting in Miami in December. A total of 1,716 physicians attended. The three most popular films were "Pheochromocytoma" by Dr. Keith Grimson, Durham, North Carolina; "Management of Obesity" by Dr. Norman Jolliffe, New York City, and "Nephrosis in Children" by Dr. Robert Cooke, New Haven, Connecticut.





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